university of toronto
computing services

UTCS ComputerNews

Now you can choose to have a bug in your computer. Really.

See page 16.

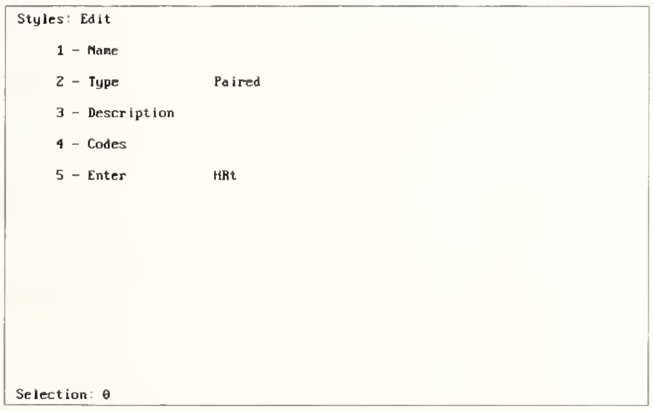
The warning may shock, but the article enlightens.

See page 17.

WARNING

NEVER reconfigure the board while the power is ON.

Turn power OFF before changing any hardware settings, such as DIP switches or jumpers. Failure to do so may cause injury to the user and/or damage to the computer.

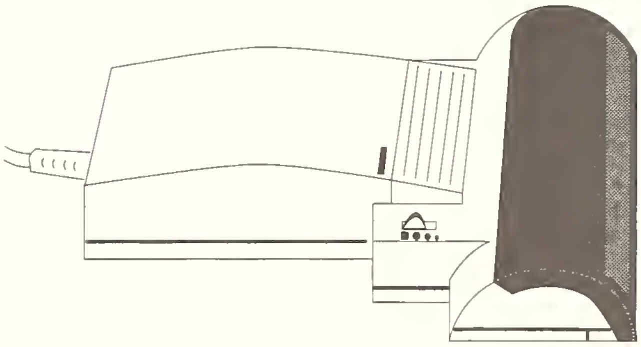


```
Styles: Edit

     1 - Name

     2 - Type            Paired

     3 - Description

     4 - Codes

     5 - Enter           HRt




Selection: 0
```

Style is more than the latest issue of *Vogue*.

See page 5.

A picture is worth a thousand words . . . and so is that article you would rather not type. Save your hands for other things.



See page 10.

. . . *plus*

UTCS organizational changes are set in motion. *see page 1*

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The Editor
ComputerNews
University of Toronto Computing Services
4 Bancroft Avenue, Room 217
Toronto, Ontario
Canada M5S 1A1

Network address:
phood@vm.utcs.utoronto.ca
(NetNorth/BITNET/EARN)

Unless otherwise indicated, network addresses appearing after the author's name pertain to NetNorth/BITNET/EARN.

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Changes at the UTCS Information Centre

What has happened

On July 30, UTCS underwent a major reorganization. As a result, the focus of User Support Services (formerly the Information Centre) has been changed from support of individual faculty, staff, and graduate students to support of projects in a number of emerging areas. Unfortunately, certain services offered to individuals in the past can no longer be provided.

How does it affect you?

The Microcomputer Lab is now available, by appointment only, for typesetting and services to provide information, such as examination of hardware and software, and CD-ROM access. All other services, such as laser printing, media and file conversions, scanning, and slide-making have been discontinued. To make appointments to use the lab, please call George Katterloher at 978-5601.

Walk-in Advising is no longer available. Please call 978-HELP to talk to an Advisor or to make an appointment with a Consultant. For floppy disk recovery problems as well as other hardware problems, please call Anatole Bakumenko at 978-6486.

What hasn't changed

All site licenses (e.g., SAS, SPSS, WordPerfect) are still available from the Information Desk in Room 201, as is access to the Reference Library in the same room. Until further notice, ProComm may still be obtained from the Advising desk, also in Room 201.

Course offerings remain the same. Registration takes place in Room 217.

When does this take effect?

All the above changes take effect Monday, September 16, 1991.

Let's Talk About It: Reorganization

Warren C. Jackson
wcj@vm.utcs.utoronto.ca

Well, gentle reader, the UTCS reorganization shoe that I signalled would be dropped last September has finally hit the floor. There are any number of reasons for the long fall time. One of the most important was the dilemma of how we could organizationally focus our efforts in newly emerging areas without totally disenfranchising certain of our user groups. I think we have succeeded pretty well, and you can judge for yourself. The detailed explanation below is a modification of the announcement note that I sent to UTCS personnel July 30. An organization chart is shown as well.

Rationale

Over the past year and a half, UTCS has been moving toward placing additional focus and concentration of its efforts in a number of areas. The new organizational structure for UTCS is intended to more clearly reflect this new emphasis and focus. The reorganization is in response to a number of pressures. First, it explicitly recognizes substantial changes in University-wide priorities. It recognizes the rapidly advancing capabilities in all areas of information technology and the emergence of applications that exploit the convergence and merging of formerly separate, somewhat independent, aspects of the technology. The reorganization is designed to facilitate efforts, in conjunction with other Computing and Communications units, to provide a set of coordinated services in various areas. It reflects the need to clearly delineate certain externally funded aspects of our activities. Finally, it anticipates new areas of support.

As a consequence of the reorganization, a number of traditional UTCS activities have had to be de-emphasized. I do not think any have been totally abandoned, but the range of products we support will be narrowing over the next little while, and the number of people who can instantly answer your questions will probably decrease.

Major areas of enhanced support that will receive explicit recognition in the new organization are instructional technology, initially applied to the undergraduate education area, office systems support, network services, internal facility management, and external networking facility management

Organizational Details

In the new organization, Eugene Siciunas, heretofore Associate Director will become Associate Director, Operations. Eugene will report to me.

Reporting to Eugene will be most of the ongoing operational activities of UTCS. Bob Chambers, Manager, Computer and Network Operations Support, and Bill Lauriston, Manager, Systems Support will report to Eugene. Vera Cabanus has been promoted to Manager, Facility Management Support, and reports to Eugene. Bob's new title reflects explicitly the increasing emphasis on networking in our operational support.

Three other groups will report directly to me. Don Gibson will be in charge of a restructured group called User Support Services. Norm Housley will be in charge of a restructured group called Network Development and Support, while Ron Vander Kraats will be in charge of a group called Administration and Information Services.

Within Bob Chamber's group, in addition to his normal networking and computer operations support functions, will be a newly formed unit called External Network Facilities Management, reporting to Dennis Ferguson. This unit will contain most of the people dedicated to our ONet and CA*net management efforts.

Vera's group will include a unit for our normal university facility management activities. This group is expected to grow, on a self-funded basis, as our facilities management efforts move into new areas such as local office systems and LANs. Another unit in Vera's group, reporting to Kam Mark, will be responsible for maintenance of microcomputer systems and peripherals. We expect this to be another substantial, self-funded, growth area.

The Systems Support Group has probably changed the least in the reorganization, but even there a change of emphasis has taken place. There is more support of UNIX and UNIX based services, and the systems support of ORACLE, the new database of choice for administrative systems, resides there as well.

Within the Network Development and Support group, a new unit called Network Services Development, under Barry Lay, has been formed. It will focus our efforts in the area of services accessible via the campus network, including electronic mail and internal and external database access.

In Don Gibson's group, User Support Services (the change of name from Information Centre) reflects a de-emphasis on the support of individual faculty, staff and graduate students, and a greater concentration on supporting projects in a number of emerging areas (and I like the new name better!). John Bradley will be responsible for the unit which supports Instructional Technology. Its initial emphasis will be a number of projects utilizing computers in undergraduate education. Alex Nishri will be responsible for the Office Systems Support unit. It will work with the equivalent unit in Systems Development, and will coordinate the efforts of other UTCS resources in the analysis and specification of solutions for office systems projects. The Advising and Consulting unit, reporting to Martha Parrott, will focus on the support of a smaller number of products and areas. (There is a modest write-up from Martha on the services of this group, included below.) The Information Technology Support unit, reporting to Terry Sanderson, will continue to support the other UTCS groups, as well as others in the area of microcomputers.

Ron Vander Kraats' group, formerly called Management Information Systems and Administrative Services, will be renamed Administration and Information Services. Pat Hood is being transferred to Ron's Group, to continue to be responsible for the Information Services unit. It will retain most of the functions of Pat's old unit, with added emphasis on short courses in support of all UTCS efforts and the administration of site licenses.

Advising and Consulting at UTCS

Martha Parrott
parrott@vm.utcs.utoronto.ca

The Advising and Consulting group is available to University faculty, staff, and graduate students. We offer two levels of support: Phone-in Advising and consultations by appointment.

Phone-in Advising is available from 978-HELP (4357) Monday through Friday between noon and 6:00 p.m. The HELP line is answered by student advisors trained by UTCS to deal with queries about the products we support. At the minimum, these advisors will be expected to handle queries on any of the product features covered in UTCS' introductory short courses—a significant increase in the depth of service offered at this level in the past. The aim of Phone-in Advising is to answer quick questions immediately, offer a call back or an appointment for more difficult questions, or, if appropriate, redirect your call to another UTCS group. It is important for us to limit the initial telephone time for each caller to a maximum of five minutes, since calls will be taken in sequence, and we would like to minimize the amount of time you spend waiting in the queue.

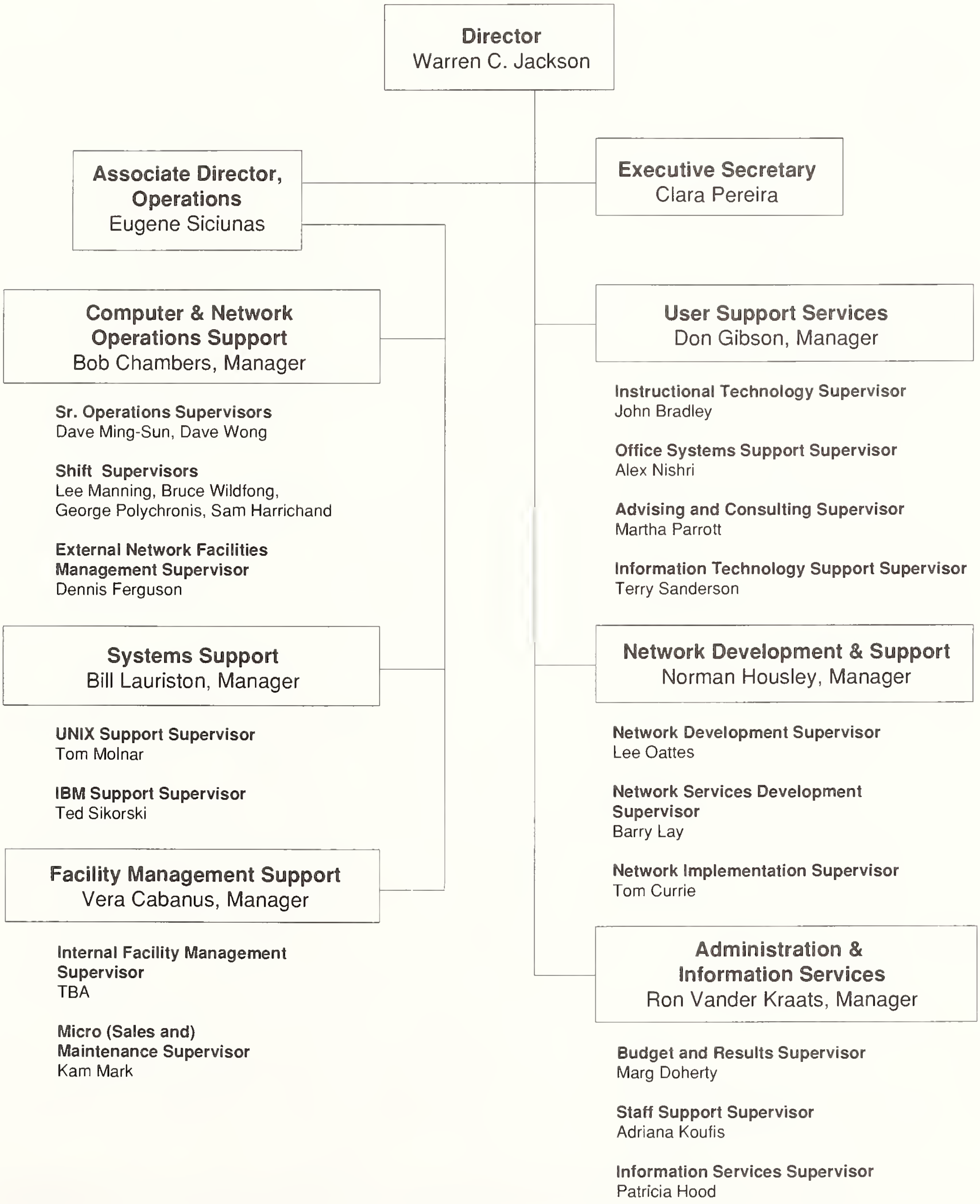
Consulting is offered by appointment only. UTCS Consultants are full-time staff members with experience in all of the products we support. In addition to a general knowledge of our range of products, each of the four consultants specializes in at least one of four areas of application software: word processing, databases, spreadsheets, and statistical packages. Appointments are limited to a maximum of one hour and are available on a first come, first served basis as time allows. We will do our best to help you in a reasonable time, using all the resources available to us within UTCS and from vendor technical support.

What exactly do we support? Below is a list of products supported by Advising and Consulting. As Warren Jackson has indicated in his announcement of the reorganization, we now support a smaller number of products. While this is true, it is also true that our statistics suggest we will still be able to deal with 70% of the queries that customarily come to us. In other words, a great majority of our constituency is using a core group of products that we do support.

IBM Platform	**Macintosh Platform**
DOS	System & Finder
WordPerfect	Microsoft Word
dBASE IV	FoxBASE
Lotus 1-2-3	Microsoft Excel
ProComm	MacKermit
	QuickMail

Use of SAS, SPSSx, and SYSTAT will be supported primarily by the Statistics Consultant; other Consultants will have some knowledge of SAS.

UTCS Organization Chart



Director
Warren C. Jackson

Associate Director, Operations
Eugene Siciunas

Executive Secretary
Clara Pereira

Computer & Network Operations Support
Bob Chambers, Manager

Sr. Operations Supervisors
Dave Ming-Sun, Dave Wong

Shift Supervisors
Lee Manning, Bruce Wildfong,
George Polychronis, Sam Harrichand

External Network Facilities Management Supervisor
Dennis Ferguson

Systems Support
Bill Lauriston, Manager

UNIX Support Supervisor
Tom Molnar

IBM Support Supervisor
Ted Sikorski

Facility Management Support
Vera Cabanus, Manager

Internal Facility Management Supervisor
TBA

Micro (Sales and) Maintenance Supervisor
Kam Mark

User Support Services
Don Gibson, Manager

Instructional Technology Supervisor
John Bradley

Office Systems Support Supervisor
Alex Nishri

Advising and Consulting Supervisor
Martha Parrott

Information Technology Support Supervisor
Terry Sanderson

Network Development & Support
Norman Housley, Manager

Network Development Supervisor
Lee Oattes

Network Services Development Supervisor
Barry Lay

Network Implementation Supervisor
Tom Currie

Administration & Information Services
Ron Vander Kraats, Manager

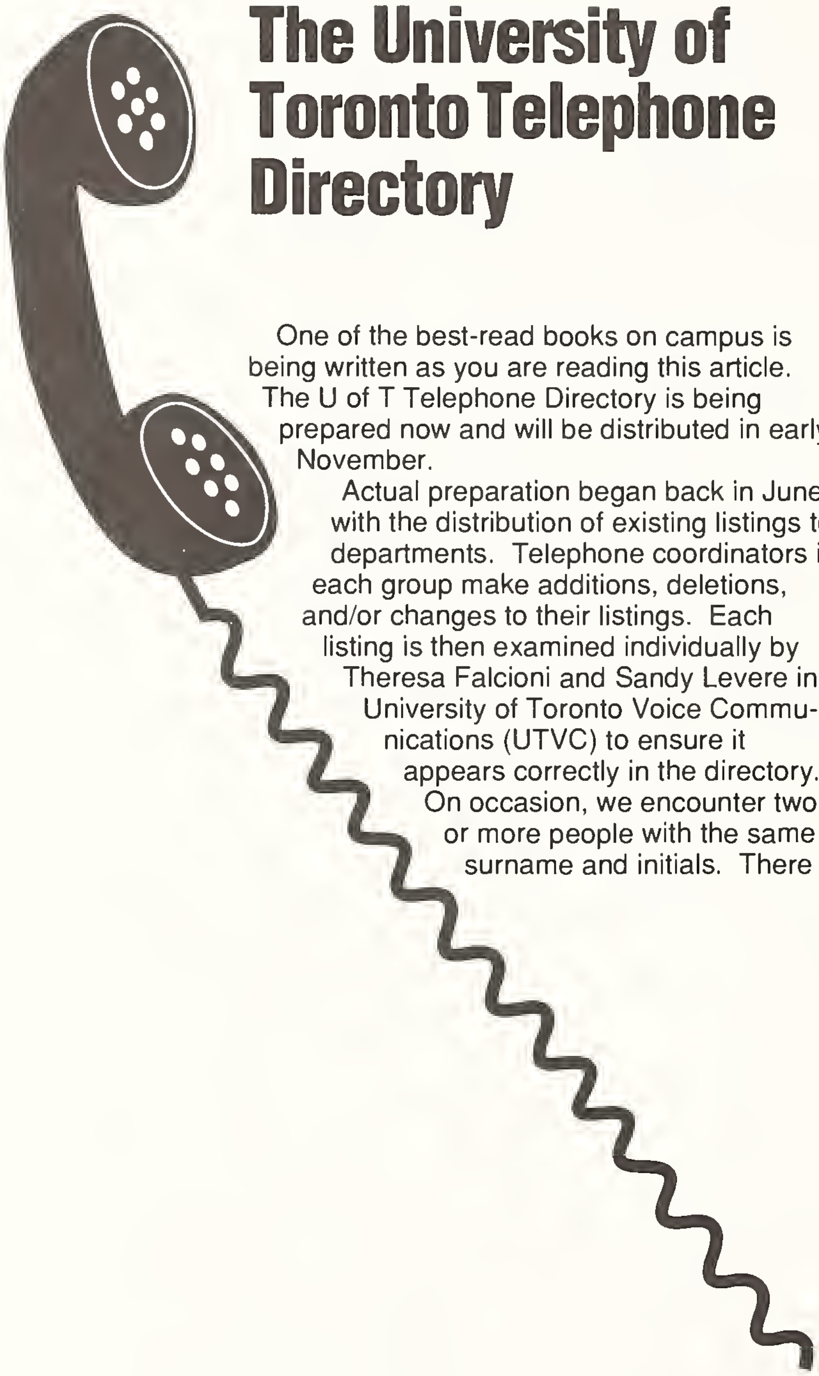
Budget and Results Supervisor
Marg Doherty

Staff Support Supervisor
Adriana Koufis

Information Services Supervisor
Patricia Hood

Computing Communications

News from UTCC



The University of Toronto Telephone Directory

One of the best-read books on campus is being written as you are reading this article. The U of T Telephone Directory is being prepared now and will be distributed in early November.

Actual preparation began back in June with the distribution of existing listings to departments. Telephone coordinators in each group make additions, deletions, and/or changes to their listings. Each listing is then examined individually by Theresa Falcioni and Sandy Levere in University of Toronto Voice Communications (UTVC) to ensure it appears correctly in the directory. On occasion, we encounter two or more people with the same surname and initials. There is nothing more personal than your name in a telephone book, so we take great care to ensure each individual appears as distinctly as possible. It is a known fact that the first thing a person does upon receipt of a new directory is to check his or her name.

Departmental listings appear in the back of the directory. The fastest-growing departmental listing isn't an actual department. Three years ago, there were no FAX telephone numbers in the directory. This year, there will be almost 200 FAX telephone numbers–over two pages of them.

A new addition to this year's directory will be a mark indicating telephone numbers that have voice mailboxes. Voice mailbox subscribers will be able to identify other subscribers, and will be able to use the "send" feature more easily. General inquiry telephone numbers for departments using voice mail to handle calls will also be identified.

This year, we anticipate the directory will have over 5,000 different listings and we will be distributing 12,000 copies.

Debbie Stewart
Voice Communications

UTCC on the Move!

University of Toronto Computing and Communications has moved to a new location in Simcoe Hall. You will be able to find the office in room 240.

Voice Communications has vacated its previous space at 1 Spadina Crescent, and is now located at 215 Huron Street, fourth floor.

Documents With Style

in WordPerfect 5.1 for the PC

Irene Rosiecki
rosiecki@vm.utcs.utoronto.ca

In the July/August issue of ComputerNews, we looked at the benefits of using formatting styles in word-processing, and looked at styles in Microsoft Word on the Macintosh specifically. In this issue, our focus is styles in WordPerfect 5.1 on the PC.

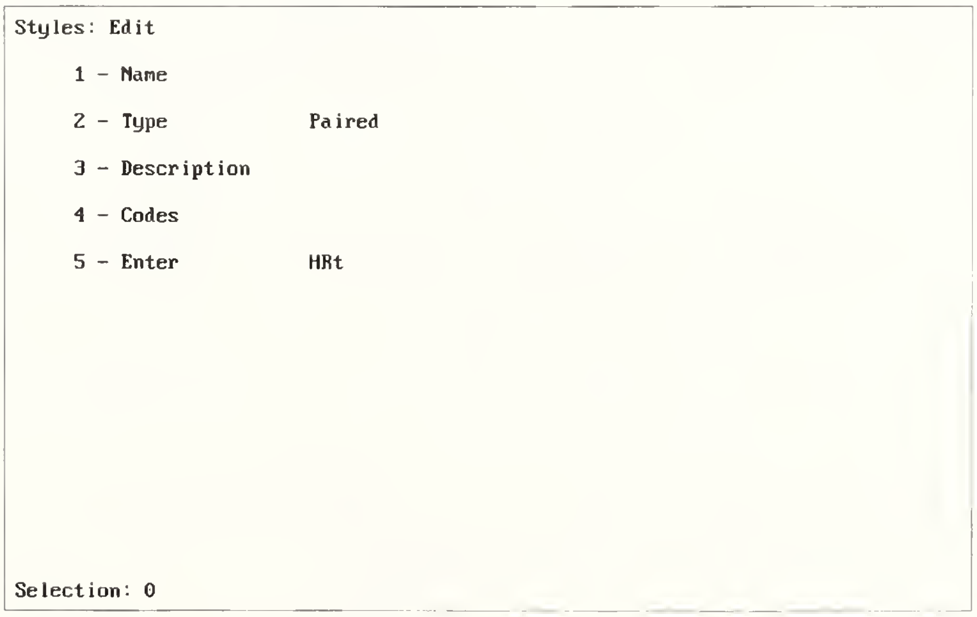
WordPerfect has a "Style" feature that enables you to store groups of formatting instructions and use them within one or more documents. This feature makes it easy to give a particular appearance to text without having to select the same formatting codes over and over again. Apart from the ease with which you can use the Style feature, you can also achieve a consistent look throughout your document. This is especially useful when you are working with a large document or with a number of documents sharing the same formatting.

A WordPerfect style may consist of formatting codes frequently used throughout a document, or it may contain both formatting codes and text. Once a style has been created, you call up the style library (more about this later), select the style, and the formatting takes place automatically. You don't have to remember all the different formatting codes selected earlier for headings, subheadings, citations, and so on. When you need to change a style, you edit it and change the formatting codes; WordPerfect automatically updates all occurrences of that style in the document to reflect your new format. You don't have to search for the codes and manually change them throughout the document.

For example, let's say you have created a style for the subheadings in your document. This style contains a serif **Font** code (Times Roman), and **Large** and **Bold** codes. While reading through the document, you decide a sans serif font (Helvetica) would look better. To change the font, all you have to do is edit the style, adding the new font. Once the style is saved, all occurrences of the subheading style code within your document will be updated automatically. (While you could use a WordPerfect macro to enter formatting codes and text, a macro is more difficult to edit than a style. In addition, any changes to the formatting done with a macro must be made manually at each place the macro was used in the document. A macro is neither as efficient nor as easy to use as a style.)

Creating a Style

To create a style, you select the **Style** feature from the **Layout** menu (<Alt><F8>) followed by **Create** from the Style menu. The Styles: Edit screen will appear (see *Figure 1*).



```
Styles: Edit

     1 - Name

     2 - Type             Paired

     3 - Description

     4 - Codes

     5 - Enter            HRt












Selection: 0
```

Figure 1

There are five elements of a style.

1-Name

WordPerfect identifies and lists the style by its name. The name is also included within the [Style On] and [Style Off] codes that are inserted into the document once the style has been selected. Each style in a list must have an unique name, up to 12 characters long. The name should be as descriptive as possible.

2-Type

Before you select formatting codes to include in a style, you must decide what type of style it is. WordPerfect has three from which to choose:

1-Paired style affects part of a document only, and inserts a [Style On] code at the beginning of a definition and a [Style Off] code at the end of a definition. Paired formats, such as bold, underlining, and font sizes are typically included in a paired style.

2-Open style inserts a [Style On] code in the document; it has no [Style Off] code. Any codes placed inside the open style will affect all text following the [Style On] code and will remain in effect until another code is encountered that changes the settings of the Open style. An Open style typically includes margin settings, headers and footers, page numbering options, and tab settings.

3-Outline style is used with the paragraph and numbering features to define a style for each level of paragraph or outline numbering.

3-Description

WordPerfect allows you to enter a description to distinguish what each style does. The description supplies information about the style to the user; it may be up to 54 characters long. Descriptions make it easier when sharing style lists with co-workers or training new staff to use your department's special styles.

4-Codes

The Codes option is used to select all the formatting codes you want included in this style, along with any text you may want to include. The only codes that cannot be included in a style are ones that are modified during a generation (e.g., index generation or master document generation). When you have selected the Codes option, WordPerfect places you in the Style: Codes screen, which is similar to a text editing screen with Reveal Codes turned on.

5-Enter

The final option in the Styles: Edit screen allows you to specify the effect of pressing the Enter key when using a paired style. The Enter key can be used to start a new paragraph in the same style, to turn off the style, or to turn off the paired style and immediately turn it on again.

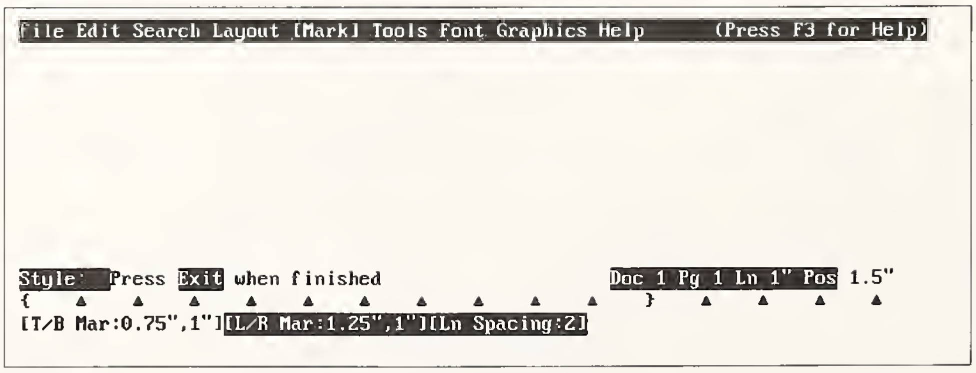
The creation of styles is best described by a couple of examples: a simple open style and a more complex paired style.

Sample Styles

A simple open style could be created for setting the basic format of a report. To begin creating this style, you select **Style** from the **Layout** menu (<Alt><F8>), followed by **Create** from the Style menu. When the Styles: Edit screen appears, you select each option in turn. A simple descriptive Name for the style would be "report style," the Type would be "Open" (because you want the style to turn on at the beginning of the report and remain in effect until you deliberately change it), and a good description would be "Set margins and line spacing for reports." At the Codes option, you enter the formatting codes for the title. To set the margins, select **Layout, Page** (<Shift><F8>,<2>) followed by **Margins, Top and Bottom**. Make the top margin .75 inches and the bottom margin 1 inch. Press <F7> to exit out to the Codes screen. For the left and right margins, select **Layout, Line** (<Shift><F8>,<1>) followed by **Margins, Left and Right**. Make the left margin 1.25 inches wide and the right margin 1 inch wide. For a double-spaced report, stay in the Line menu and select **Line Spacing, 2**. Press <F7> to set these instructions and exit to the Codes screen. *Figure 2* is an example of how the codes will appear in the Style: Codes screen.

A more complicated paired style would be one created for formatting the title page of each chapter in a book. This style would suppress any headers or footers set in the document and print a page number at the bottom centre of the page; insert a horizontal graphics line at the top of the page; and change the font, size, and alignment of the chapter title. A simple descriptive Name would be "chapter head" (remember the 12 character limit), the Type would be "Paired," and the Description would be "Formats chapter title and first page." The first step in defining the formatting codes is to suppress the

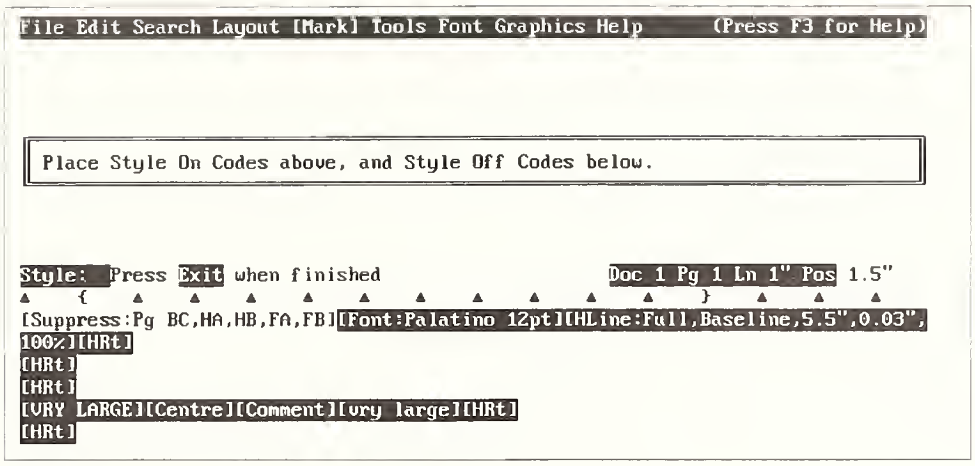
Figure 2



```
File Edit Search Layout [Mark] Tools Font Graphics Help       (Press F3 for Help)




Style:  Press Exit when finished                     Doc 1 Pg 1 Ln 1" Pos 1.5"
{    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    }    ▲    ▲    ▲    ▲
[T/B Mar:0.75",1"][L/R Mar:1.25",1"][Ln Spacing:2]
```



```
File Edit Search Layout [Mark] Tools Font Graphics Help      (Press F3 for Help)



 Place Style On Codes above, and Style Off Codes below.



Style:  Press Exit when finished                      Doc 1 Pg 1 Ln 1" Pos 1.5"
▲    {    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    ▲    }    ▲    ▲    ▲
[Suppress:Pg BC,HA,HB,FA,FB][Font:Palatino 12pt][HLine:Full,Baseline,5.5",0.03",
100%][HRt]
[HRt]
[HRt]
[VRY LARGE][Centre][Comment][vry large][HRt]
[HRt]
```

Figure 3

headers and footers and change the page numbering. To do this, position the cursor on the [Comment] code so that it is highlighted. Select **Page** (<Shift><F8>) from the **Layout** menu, choose **Suppress (this page only)**, followed by **Suppress Headers and Footers**, and **Print Page Numbers at Bottom Centre - Yes**. Press <Enter> to set this format.

To change the font, select **Font** from the menu (<Ctrl><F8>), **Base Font**, place your cursor on the name of new font, and press <Enter>. Now you are ready to insert the horizontal graphics line. Choose **Line** from the **Graphics** menu, followed by **Create Horizontal** (<Alt><F9>,<5>,<1>). The only setting that you need to change for the horizontal line is the line width. Select **4** - Width of line, type .03", and press <Enter>. Press <Enter> two more times to insert three blank lines between the horizontal line and the chapter title.

Choose **Font** again, but this time select **Size**, **Very Large**. To centre the chapter title, select **Layout**, **Align**, **Centre** (<Shift><F6>). Because this a paired style, you need to insert additional codes after the [Comment] code. (The [Comment] code represents the title you will be entering later.) Using your cursor key, move the cursor to the right of the [Comment] code. Select **Normal** from the **Font** menu to turn the size code off. Press <Enter> twice—once to turn off the centring code, and once to put in a blank line. Press <F7> to finish defining the formatting for the style. Since you want this style to end when you start the first paragraph in the chapter, you set the Enter option to "Off." If you set it to "HRt" by mistake, WordPerfect would treat each new paragraph as a chapter title! *Figure 3* is an example of how the codes will appear in the Style: codes screen.

Short-cut Styles

If you have a document that is already formatted exactly as you want, you can use it to create styles quickly. In **Reveal Codes**, you block the codes that you want in the style, then select **Layout, Style, Create** (<Alt><F8>, <3>) and enter a name for the new style. WordPerfect will assume it is a paired style unless you specifically set it to open. By repeating this procedure for each specially formatted part of your document, you can create a list of styles in no time.

Saving Styles

After you have created a style, you can save it in a file so that you can use it in other documents as well as the one in which it was defined. To do this, you select **Style** from the **Layout** menu (<Alt><F8>), choose **Save**, and enter a name for the list of styles. If a separate style directory does not exist, WordPerfect will save the styles in the default directory.

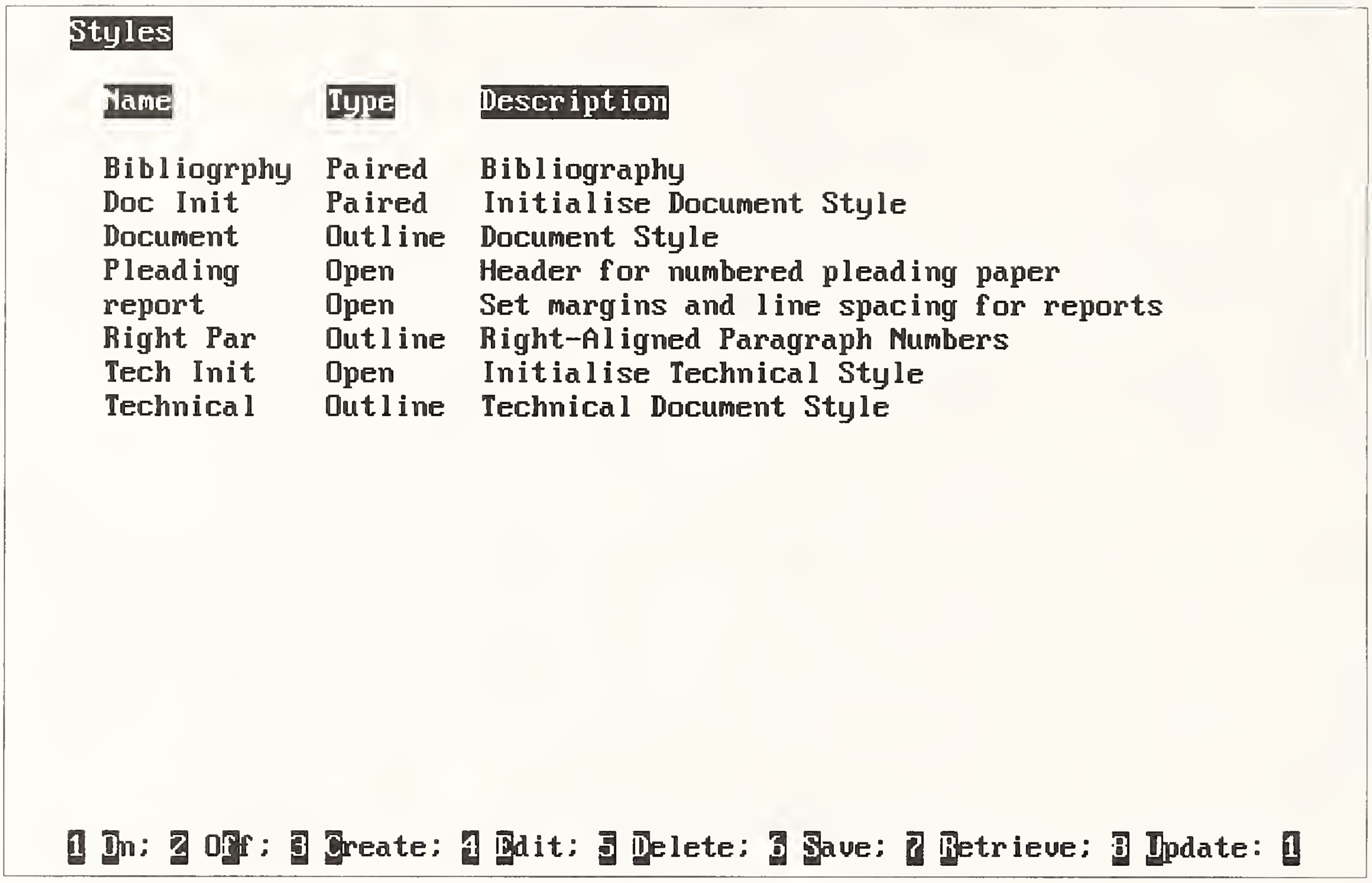
Any time you save a document, any styles associated with it are saved also. If you don't save the styles to a separate file, they will be saved with the document in which they were first created, thereby making them unavailable to other documents.

Using Styles

Once styles have been created and saved, it is quite easy to use them in your document. If the text has already been typed and you are using a paired style, you will have to block the text before selecting a style for it. If you are using an open style, you place the cursor at the beginning of the text where you want the style inserted. Once you have indicated which text is to be formatted, you choose the **Style** feature from the **Layout** menu and, using the cursor key, select the style you want from the menu. Press **On** to use that style. To format with styles while you are entering text, select a style as described above and immediately type your text. If you choose a paired style, when you press the Enter key WordPerfect will either end the style, continue it, or turn it off and immediately on again (depending on the Enter setting specified when the style was defined).

The Style Library

As you become comfortable using styles, you will find them indispensable for formatting. To make a specific list of styles automatically available each time you create a new document, you can use WordPerfect's Style Library. The Style Library is a default list of styles that is retrieved when you select the Style feature. WordPerfect must know the name of the file containing



```
Styles

  Name         Type      Description

  Bibliogrphy  Paired    Bibliography
  Doc Init     Paired    Initialise Document Style
  Document     Outline   Document Style
  Pleading     Open      Header for numbered pleading paper
  report       Open      Set margins and line spacing for reports
  Right Par    Outline   Right-Aligned Paragraph Numbers
  Tech Init    Open      Initialise Technical Style
  Technical    Outline   Technical Document Style










1 On; 2 Off; 3 Create; 4 Edit; 5 Delete; 6 Save; 7 Retrieve; 8 Update: 1
```

Figure 4

the styles and the directory where the file is stored before it can be retrieved. To specify a default list, you select **Setup** (<Shift><F1>) from the **File** menu, **Location of Files**, and **Styles Files**. Then you type in the location or pathname, along with the name of the file containing the list of styles. (See *Figure 4*.)

The first time you select the Style feature in a new document, the default Style Library is retrieved for you to use. In an existing document, when it retrieves the Style Library, WordPerfect checks any styles already associated with the document for the names matching those in the default list. If some match, WordPerfect will ask you whether you want to replace the current styles with the styles of the same name from the Style Library. If you type "No," WordPerfect will only retrieve those styles whose names did not match. If you type "Yes," WordPerfect replaces the current styles with the ones from the incoming files. If you have created custom styles for this document, you would usually answer "No" to avoid losing your custom styles.

Style Editing

As mentioned earlier, changing formatting codes in a style is easy. You tell WordPerfect that you want to edit the style by selecting **Styles** from the **Layout** menu, placing the cursor on the name of the style you want to edit, and selecting **Edit, Codes**. Then, you go ahead and change the formatting codes using your cursor and editing keys. You press <F7> when you have finished editing the style, and WordPerfect automatically updates all occurrences of that style in the document to reflect the editing change.

In Conclusion

Styles are easy to create and use. Once you start creating and applying styles to your documents, you'll wonder how you ever lived without them. Document preparation becomes a breeze as you create styles for the different parts. Reformatting is no longer a long, tedious, error-prone task. Once you have mastered styles, it will seem like your documents almost format themselves.

This is the first in a series of articles about the INTERNET. Articles over the following months will discuss various types of documentation and information about the INTERNET and how the INTERNET can help you with your work. This first article introduces the INTERNET to those who may be unaware of its existence.

Introduction to the INTERNET

Herb Kugel
herb@gpu.utcs.utoronto.ca

The INTERNET is the network of networks that encompasses literally thousands of machines and millions of people. It contains a vast array of information on a diverse range of topics, and information is accessible to any user. The INTERNET originally evolved out of the ARPAnet, a U.S. Department of Defence experimental network connecting hosts (computers) and terminal servers. Procedures were set up to regulate the allocation of addresses and to create voluntary standards for the network. As the INTERNET grew and other networks came into being, standards were developed specifying the details of computer communication and the interconnection of networks. A series of protocols were formally defined.

Transmission Control Protocol (TCP) is defined as the major transport protocol in this suite of protocols and is created to provide reliable, connection-oriented full duplex streams. This protocol specifies the format of the data and acknowledgements that two computers exchange in order to obtain reliable data transfer, as well as the procedures used to insure that the data arrives correctly. TCP uses the INTERNET Protocol (IP), the network layer protocol. IP defines, among other things, the basic unit of data transfer and the exact format of all data as it passes across the INTERNET. It is such a fundamental part of the design that the INTERNET is sometimes called an IP-based technology. Of course, there are many other protocols, and the entire collection is sometimes referred to as TCP/IP. One of the most well known protocols is probably the Simple Mail Transfer Protocol (SMTP), the INTERNET electronic mail protocol. You often see these letters in the headers of your electronic mail.

Briefly then, the INTERNET is the total collection of hosts and networks that adhere to these protocols. There are literally thousands of them. Our CA*net is part of the INTERNET as is, among many others, NSFNet, the National Science Foundation network. Each of these networks, as well as many others, has available through it data that can be helpful to the scholar or researcher. In addition, many of the hosts run remote applications that can be accessed and can be quite helpful.

As the networks grew in number, obtaining information from what was available became a serious problem. Though considerable progress has been made, it is still far from being completely solved. These efforts will be discussed in future articles. Next month, we will introduce the FTP (File Transfer Protocol), the INTERNET protocol used to transfer files between hosts (computers), and discuss how the FTP may be used to obtain the INTERNET Resources Guide, a valuable first step in "navigating" the INTERNET.

In the meantime, if you are interested in learning more about the INTERNET, please contact *herb@vm.utcs.utoronto.ca* or *herb@gpu.utcs.utoronto.ca*.

The Typist Hand-held Scanner for the PC

Easby Ho
pubscoop@vm.utcs.utoronto.ca

Picture yourself as you walk into a library with a laptop computer and a hand-held scanner that lets you read printed text from a document directly into either a Windows or MS-DOS application program. Instead of borrowing and carrying heavy volumes back to your office and manually entering the data into your computer, you scan the information you require directly into your laptop. The data is ready for manipulation and you have the option of processing the information on your laptop immediately, processing the text on your laptop later, or eventually transferring the data to another computer. The use of a laptop and a scanner, however, would not be restricted to libraries—imagine the possibilities for out-of-town conferences, on-site meetings, and so on. With this scenario in mind, we decided to test the accessibility of using a laptop with a hand-held scanner. As the ideas took shape, we began to seek out loan equipment for testing. Our first acquisition was a complimentary review copy of the Typist from Caere Corporation.

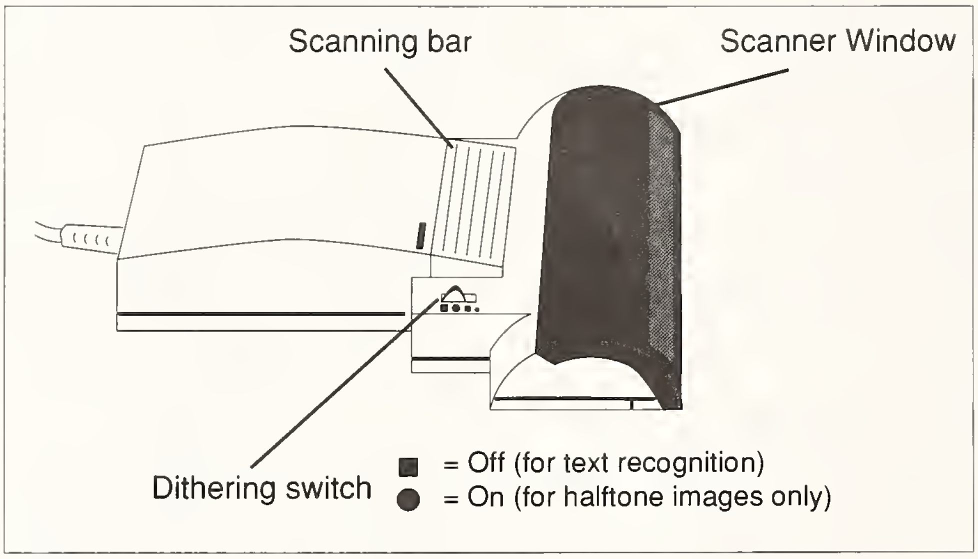

Scanning bar
Scanner Window
Dithering switch
■ = Off (for text recognition)
● = On (for halftone images only)

Figure 1 show parts of the Typist scanner.

What is the Typist?

According to Caere, the Typist is the first hand-held scanner designed specifically for Optical Character Recognition (OCR), letting you read printed text from a document directly into a word-processing or other program with text-handling capabilities. Our review copy of the Typist was an 80386 version (requiring an 80386-based microcomputer) that offered 300 dot-per-inch (dpi) resolution for scanned graphics, in addition to its text scanning abilities. Both its software and hardware have been optimized for recognition. The software incorporates Caere's AnyFont™ technology, which is used in the OmniPage™ family of OCR products. The scan head is five inches wide, allowing an 8.5 x 11 inch page to be scanned in two passes. You position the scanner on top of the material to be scanned and drag it down or to the right (depending on the material) while holding down the scanning bar, and the Typist converts the material to an electronically-readable text or graphic format.

The Typist comes with both DOS- and Windows-based software, and operates within the program you have active. Typed, laser-printed, or draft-mode dot-matrix text can be scanned. Scanning can be done by simply turning on the Typist and setting the control panel interface or Text Settings dialog box. You can scan multi- or single-columned pages from top-to-bottom, or sideways, and merge the text with the Typist's "knitting" capabilities.

The Typist recognizes text printed in any non-stylized font from 6 to 72 points and eleven foreign-language character sets: Danish, Dutch, English, French, German, Irish/Gaelic, Italian, Norwegian, Portuguese, and Spanish. In addition to preserving most diacriticals, the Typist can recognize more than one foreign language at a time. In the Text Settings dialog box, you simply select the language(s) of your choice. The Typist can also output data in spreadsheet format.

In addition to its OCR capabilities, the Typist can be used for scanning graphics. Images can be scanned as line art or halftones by setting the dithering switch on the right side of the unit. You simply scan the image, save it in PCX or TIFF format, and later import it into a graphics program.

For higher accuracy, the Typist can automatically adjust its brightness setting. Another nice feature is that the Typist provides an image of the scan that you can save as a graphics file. After each scan, you can click on the "Image" button in the Text Settings dialog box and view an image of the completed scan. By examining this image, you can determine the accuracy of your scanning.

The Typist is always "on." Even when it's not in use, the light in the unit will be illuminated. This feature eliminates turn-on time, and prolongs the life of the light emitting diodes (LEDs).

How Does the Typist Scanner Work?

In general, a scanner translates its "view" of a page into "bit-map" data by dividing up the image into millions of dots or "bits" (approximately 40,000 to 90,000 per square inch). A value is assigned to each dot, depending on whether it's inked or blank. The composite document that is stored in your computer is the "map" of these dots: hence the term "bit-map." Like a finished photograph or painting, this bit-mapped image is fixed and uneditable. The only way to change it is to draw or paint over it.

Text characters are made up of codes assigned to each letter, number, or symbol. While various code sets are in use, the most common code set is the American Standard Code for Information Interchange (ASCII) table of character equivalents. Since each character is assigned a separate code, corresponding to the keys on the keyboard, the text is fully available for editing.

Converting a bit-map to ASCII code might seem simple, but "matrix-matching," or comparing a bit-map's shape to a library of character shapes works only for a limited number of fonts and sizes. Text characters vary considerably, and it would take a gigantic computer to correctly match all character shapes.

> OCR software lets you use a scanner to "read" text from the printed page to the computer.

But with the development of OCR technology, scanning took on a new direction. OCR software lets you use a scanner to "read" text from the printed page to the computer. The page is scanned as a picture, then the OCR software tries to recognize the individual letters. The Typist uses this matching method when scanning text.

Working with the Typist

Until we could find a suitable laptop for use with the Typist, we tested the Typist with our Zenith Z-386 machine using Windows. The basic concepts of the Typist were easy to grasp. The Owner's Manual was easy to work with and simplified the learning process considerably.

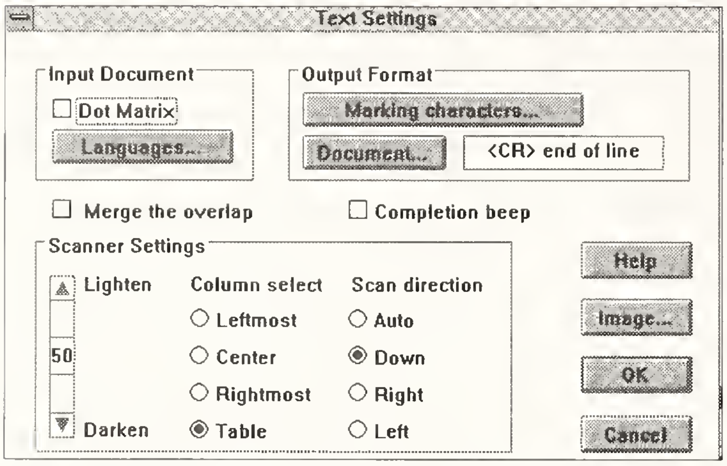
Installation

Before any testing could be done, the Typist hardware and software had to be installed in the computer. (The Typist comes with its own interface board which handles much of the processing required for scanning, and to which the scanner is connected.) We had to decide whether we wanted to install the Typist as a Windows or as a DOS application. For our purposes, we chose to install the Typist as a Windows application. We removed the computer cover and placed the Typist interface board into an empty expansion slot inside. (No adjustment of the DIP switches for I/O addresses was necessary, though detailed directions were provided in the manual.) After replacing the computer cover, we plugged the scanner into the interface card and were ready to install the software.

We ran the TINSTALL program located on the Typist Program Disk and provided the necessary information about our system, the drive and directory where we wanted the Typist to be installed, and the drive and directory where Windows was installed. After updating our AUTOEXEC.BAT file to run the Typist in Windows, we rebooted the computer. The entire process was fairly straightforward. With a little technical support, you should have no problem doing the installation yourself.

Scanning Text

After the hardware and software had been successfully installed, we began testing. To scan text, we first made sure the Typist was securely connected to the computer, started up the computer, and opened up Windows. After clicking on the Typist icon, we adjusted all necessary specifications in the Text Settings dialog box (see *Figure 2,* next page), such as the Column select (depending on whether the document was in column or paragraph format) and the Scan direction of the Typist (top-to-bottom, left-to-right, or right-to-left). We then opened up Microsoft Word and started a new document, making sure the cursor was blinking where we wanted the scanned text to appear in the document. For the actual scanning, we placed the Typist on the page to be scanned, slightly above the first line of the text (see *Figure 3,* next page). Then, holding down the scanning bar, we guided the scanner along the column of text in the direction we had selected (top-to-bottom in the



Text Settings

Input Document

☐ Dot Matrix

Output Format

<CR> end of line

☐ Merge the overlap

☐ Completion beep

Scanner Settings

Lighten 50 Darken

Column select: ○ Leftmost ○ Center ○ Rightmost ● Table

Scan direction: ○ Auto ● Down ○ Right ○ Left

Figure 2 shows the Text Settings dialog box.

example). We tried to maintain steady and constant scans with the scanner lens parallel to the text, scanning at an approximate rate of four seconds per page (slower for more complex fonts, as recommended in the manual). At the end of the text, we released the scanning bar, the text-recognition status window appeared and, after recognition was completed, the text appeared in Word. The entire procedure took about two minutes.

Initially, we experimented with the example pages located at the back of the Owner's Manual. Scanning the pages top-to-bottom and sideways, we tested the Merge function and brightness control. The pages were scanned repeatedly until we were comfortable with the Typist scanner. Scanning top-to-bottom was easiest since we didn't have to worry about knitting (merging two sideways scans), and sometimes produced better results than scanning sideways. We tested different languages, such as French, German, and Portuguese. We also tried a variety of materials, from FAX paper to newsprint. Generally, careful scanning provided results that ranged from workable to excellent. Certain characters however, like mathematical symbols, chemical formulae, and special fonts, caused recognition problems. For example, in a mathematical equation, the Typist was unable to recognize the infinity symbol (∞).

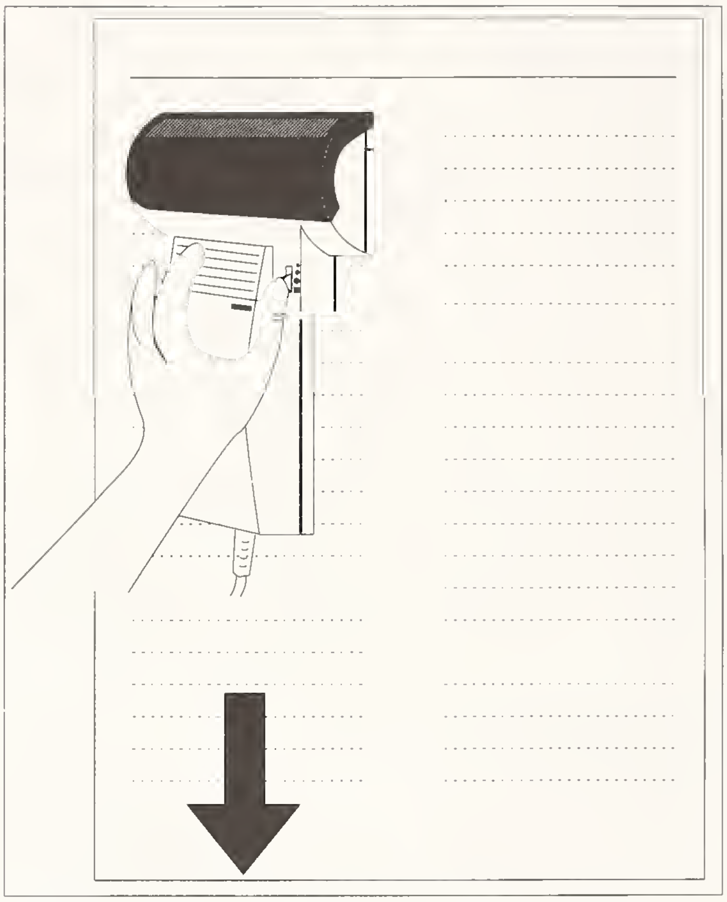


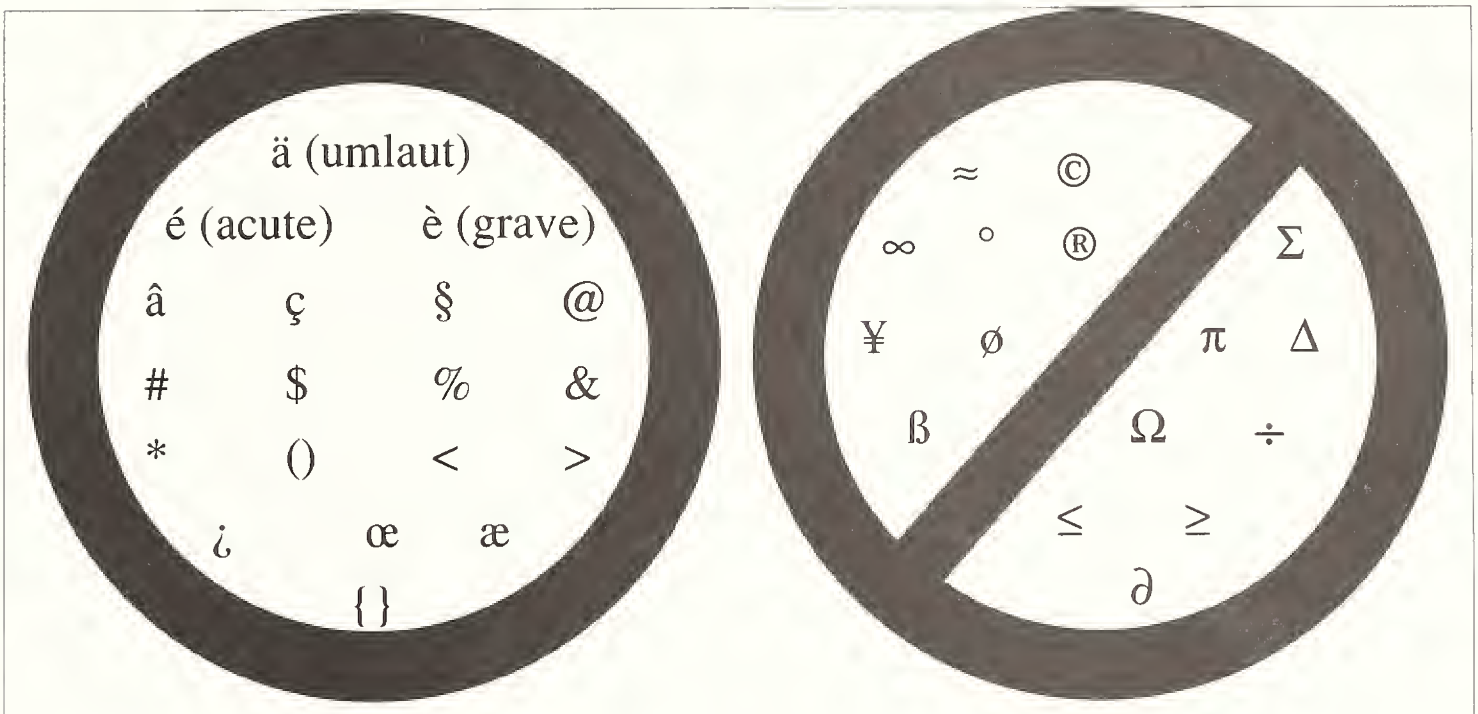
Figure 3 shows how to scan text laid out in two columns.

The format (e.g., paper, binding, or margins) of a document often influenced the scanning results. Sometimes, scanning the photocopy of a document produced better results than scanning the original. This was particularly true for documents with thick or tight bindings, uneven surfaces, or irregularly-sized paper. Occasionally, depending on typeface and quality, photocopying the original only smudged the text and confused the Typist. Our testing supported the recommendation made by Caere to avoid scanning on soft surfaces, that is, books with tight bindings or warped paper. The Typist should sit flat on the document throughout the scan in order for all the text to be read into the application and for recognition to take place. If necessary, you can photocopy the page, then scan on a flat table. You should be able to view the text through the scanner window.

The Typist's accuracy and speed can also be improved by adjusting the brightness level in the Text Settings dialog box. To automatically adjust the brightness level, you place the scanner diagonally across the text on the document, and click the scanning bar once. If the LEDs flash three times, you repeat the procedure at a different part of the page. If brightness still cannot be adjusted automatically, you have to set the brightness manually in the Text Settings dialog box.

The Typist as a DOS Application with dBASE IV

In one experiment, the Typist was used to scan records from a library rolodex of authors for storage in dBASE IV. Before we began, we first reinstalled the Typist software as



Typist recognizes the characters above.

Typist does not recognize the characters above.

Figure 4 illustrates characters and symbols that scan successfully, and those that Typist does not recognize.

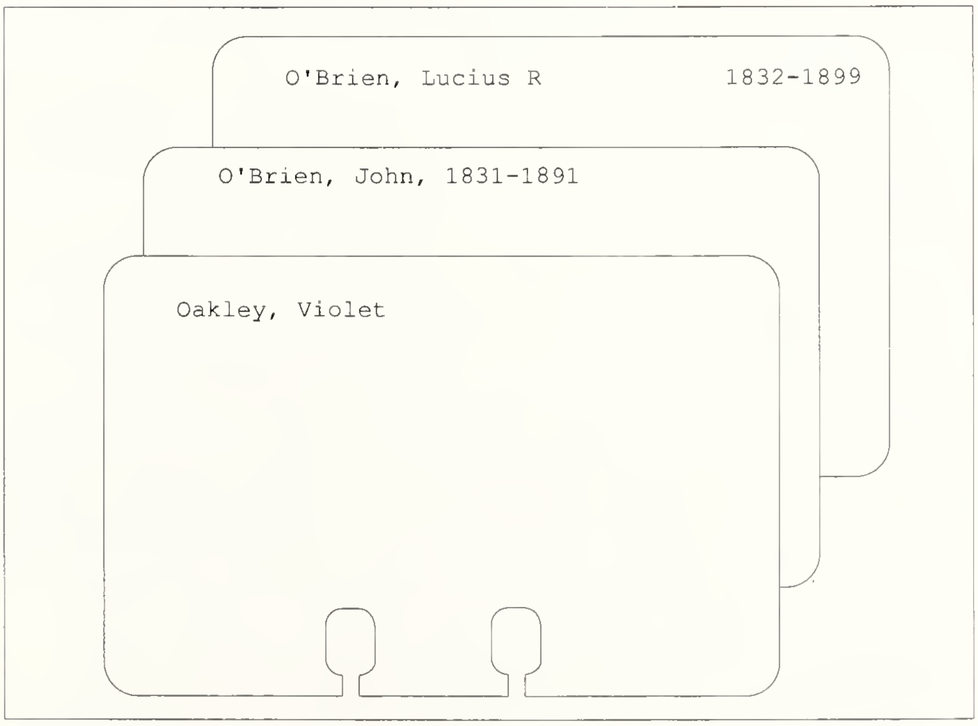


Figure 5 illustrates the rolodex cards that would not scan properly.

a DOS application. Once installation was completed, we began scanning. The first two records were scanned without any problems and reproduced perfectly in the database. But the irregular spacing and length in the third record (see *Figure 5*) caused the record to be truncated in dBASE IV. Though the third scan was repeated again and again while adjusting the Typist Text Settings dialog box, the record could not be reproduced correctly. When the first two records were scanned again, the results this time reproduced incorrectly. The errors may have been caused by the rolodex cards (small rectangles) or even human error (though the scans were repeated many times), but the results nevertheless proved to be too inconsistent and undependable for us to be able to recommend its use in this case. Unfortunately, this was a common occurrence, rather than an isolated incident. Similar problems were encountered when we scanned foreign language texts and some tables.

Scanning Images

Though line art and halftone images posed little problem, colour images scanned poorly. With black and white photographs, the resulting images resembled photocopies. To scan an image, you start the Typist as for text, and manually adjust the dithering switch on the right of the unit to indicate how the scanner will represent gray areas of the graphic. The square setting is for text recognition and line-art images only. For use with halftone images, you select one of the three circles, the smallest circle for the most dithering. Depending on the quality of the graphic, you either reduce or increase the brightness level in the Text Settings box. (The image control settings are located in the Text Settings box.)

When scanning images, make sure the image is lying on a hard, flat surface. If necessary, photocopy the image first to avoid distortion from the original. Once scanned, you either save the graphic or cancel and repeat as desired. (To retain the image, you copy the image to the Windows clipboard by clicking on the Copy button and then paste it in a graphics application, or save it as a TIFF or PCX file using the Save As command.)

Scanning Problems

Human error tended to be a significant factor in the Typist's performance. You must be patient and precise, moving slowly and consistently over a document to scan properly. In general, hand-held scanners do not give the highest quality image because people tend to change hand speed while scanning, and there is a natural tendency to not maintain a straight scan. Occasionally, users drag the scanner into the cord, which can snag or cause friction, and disrupt the scan. When any of the above happens, the Typist cannot read all of the text (or image) and the stored material is either incomplete or contains numerous errors.

Often, the items themselves create problems for the Typist as well. Depending on the paper quality, the text (or graphic) may be stretched by the Typist and cause recognition problems. Certain documents and tightly bound books with narrow margin spaces complicate the scanning process because the scanner lens cannot mechanically reach parts of the text and only partial recognition takes place.

Manipulating the Typist was easy, but determining the source of problems was more complicated. In our opinion, the Typist does not provide an effective feed-back system, so any human or mechanical errors are difficult to detect. The status window will show a crooked scan or smudged text, but it will not tell you if you are not active in an application (as indicated by a flashing cursor), nor will you be alerted to a faulty scan. If you scan too fast or inconsistently, the Typist simply won't recognize the text. Your only alternative then is to repeat the scan and hope you are correcting the mistakes from the previous scan. Using trial and error, you may have to complete several scans before you achieve the desired results.

The Typist and the Toshiba Laptop

To complete our scenario of portable scanning, we needed a laptop compatible with the Typist. A representative from Toshiba Canada graciously made arrangements for us to borrow a Toshiba 3200 laptop for a couple of days. (The Toshiba 3200 is one of the few laptops that fulfilled the specifications set out by the Typist: an 80386-based CPU, a full-sized empty slot for the Typist interface card, a minimum of four megabytes of Random Access Memory (RAM), and DOS 3.1 or Windows 3.0 installed in the machine.) Even though the laptop had to be returned within a few days, the experimenting we accomplished concluded the following.

Principally, the reality of information portability is still a thing of the future. Though it was possible to connect the Typist to the Toshiba, carry the bulk, plug the laptop into an electrical outlet, and actually scan material, the entire task was not easy. Alone, the Toshiba laptop weighs approximately seven kilograms—though its size is necessary in order to meet the specifications stipulated by the Typist. Combined with the Typist, the manuals, floppy diskettes, and your own personal luggage that you need to carry, the entire package can easily amount to 10 kilograms.

Running Windows on the laptop uses up a lot of memory, slows down processing, and has a tendency to crash. The Typist is always on and consequently draws a lot of power. Until the Typist is built with its own power source, an outlet providing an external energy source is required. For now, scanning with a laptop is neither convenient nor truly accessible.

The Typist for Persons with Disabilities

People with minor physical disabilities, such as low vision, may benefit most from the Typist. People with hand impairments but with sufficient hand control, such as those suffering from arthritis, may find using the Typist more efficient because it would reduce the number of keystrokes required to enter text. Using the Typist with an orientation guide, along with a screen reader, voice/speech synthesizer, and/or print magnification software may allow persons with disabilities to achieve a certain amount of autonomy.

Overall Performance

Though the Typist is fast (able to recognize text at a rate of hundreds of words per minute), the speed with which the Typist recognizes text depends largely on the microprocessor in your computer and the quality of documents you are scanning. An 80386SX CPU will scan at a rate of approximately two hundred and fifty words per minute, while an 80486 CPU will scan at about five hundred words per minute.

We believe the Typist can be improved upon by a few enhancements, namely an adjustable window for flexibility in scanning width, as well as an interactive window on the screen to monitor scanning so that users can make sure they are maintaining a steady hand.

The Typist is a cost-effective alternative to expensive flat-bed scanners. Nevertheless, the Typist is best for non-critical tasks, such as scanning a few paragraphs or pages; it is not designed to scan dozens of pages in one session nor to replace a user's need for a flatbed scanner. The Typist will probably best fulfil the needs of experienced computer users, specifically those adept at solving unexpected software-related problems, who can deal with the Typist's capricious nature, and who need to do occasional scanning.

Vendor:
Caere Corporation
100 Cooper Court
Los Gatos, CA 95030
USA
(408) 395-7000

Hardware Requirements:
IBM-compatible 386 (or 386SX), or PS-2 computer;
640KB conventional and 2MB extended RAM (although 4MB RAM are recommended);
3MB free hard-disk space;
DOS 3.1 or higher;
An empty half or full expansion slot for the Typist interface card.

DOS installations only:
To scan graphics, you must have a CGA, EGA, VGA, or Hercules graphics-compatible video card.

Windows installations only:
Windows 3.0 installed on your system and a Windows-compatible mouse.

Free Electronic Mail Demonstration

Anyone interested in sending documents to colleagues or friends reliably, quickly, and inexpensively will not want to miss this demonstration. We will introduce you to the NetNorth/BITNET/EARN communications network, which is accessible from the CMS system. This network connects more than a thousand universities and research institutes in Europe, Asia, and North America. Sending documents or files over the network is very easy to learn.

We will show you how to send mail and files to another institution, and how to talk directly to someone on the network. ***Please note this is a demonstration only.***

Space is limited. If you would like to attend this demonstration, please contact Irene Rosiecki at 978-4565 to reserve a place.

ProComm Communications Program Seminar

ProComm is a general purpose communications program currently available to all U of T faculty, staff, and students. It is suitable for connecting to the many networks on campus.

A seminar has been scheduled to introduce ProComm and its various features: terminal emulation (a number of popular ones will be reviewed); the dialing directory; file transfer protocols, such as Kermit and XMODEM; configuration and modem parameter settings; and the DOS gateway, which allows you to execute DOS commands and other programs while you are still in ProComm.

There is a fee for this seminar. To reserve a place, please contact Irene Rosiecki at 978-4565.

IBM M-Motion Video Adapter

Terry Jones
tj@gpu.utcs.utoronto.ca

The IBM M-Motion Video Adapter is much more than a simple video adapter card. As well as having the ability to display live video on your computer screen, the M-Motion Adapter provides audio control capabilities, and the ability to capture video images and store them on your computer's hard drive. It is designed to be used in IBM Micro Channel computers.

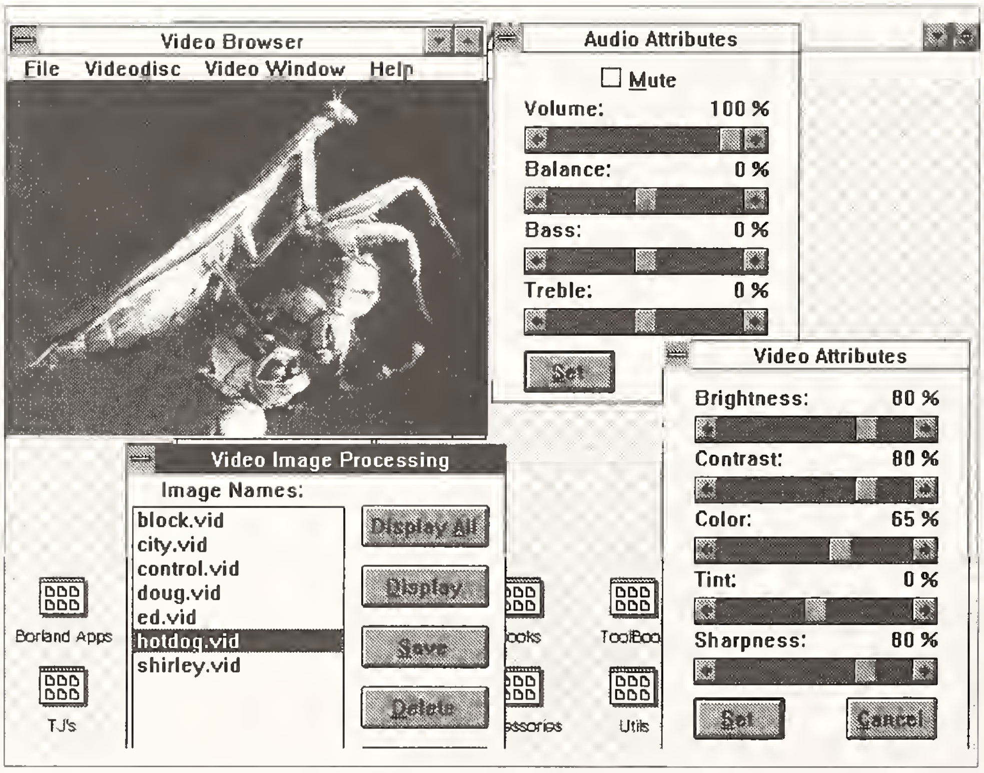
Live Video

The live video capabilities of the M-Motion Adapter make it a good choice for multimedia applications involving some form of motion video. You can plug a VCR, camcorder, or laserdisc player directly into the M-Motion Video Adapter and see the picture in a window on your computer screen.

You can control the size of the onscreen video window. You can scale the window, which automatically shrinks or expands the whole video image to fit inside it. You can also choose to show only a portion of the video. The window can act like a porthole through which you see part of the video image. Computer graphics can also be placed on top of the video images, which can be useful for labelling and pointing out areas of interest within the video images.

You have very good software control of the video. Brightness, contrast, colour, tint, sharpness, and fade to black are features your program can control. You can connect up to three NTSC video signals or two Y/C (Super-VHS) signals (Y/C=brightness and colour), and your program can select any one of these signals. An output synchronization signal is provided, which allows you to synchronize external video signals.

Figure shows a video image in the video browser window.



☐ Mute
Volume: 100 %
Balance: 0 %
Bass: 0 %
Treble: 0 %

Brightness: 80 %
Contrast: 80 %
Color: 65 %
Tint: 0 %
Sharpness: 80 %

Image Names:
block.vid
city.vid
control.vid
doug.vid
ed.vid
hotdog.vid
shirley.vid

Frame Grabber

The M-Motion Adapter can also capture video images. It is a "frame grabber" in that it instantly captures the current video screen. The card actually digitizes (converts from an analog video signal to digital computer data) the video signal in 1/60 of a second. Even moving images can be captured. This digitized image can be stored on disk. Stored images then can be called up from disk and displayed as stills in a picture window. The sample Windows 3.0 program provided with the adapter can also copy these video images onto the Windows clipboard so you can paste them into other programs, such as PaintBrush or PageMaker.

Audio Control

Audio signals from your video source can also be connected to the M-Motion Adapter. The M-Motion Adapter will play these audio signals through the speaker in your PC, and/or send the signals out another set of audio jacks to an optional amplifier/speaker arrangement. Your program can control, through the adapter, the volume, balance (stereo signals), and tone of the audio signals. Various configurations of audio signals can be connected to the M-Motion Adapter's audio jacks. Two stereo signals, four mono signals, or one stereo and two mono signals can be connected. Under software control, you can select individual or mixed signals. You can choose to use one of the stereo inputs as the mono signal for both audio channels and output jacks. The adapter also allows you to digitize audio signals, store them on the hard disk, and play them back later.

Software

The software provided with the M-Motion Adapter includes a diagnostic setup utility and some example control programs. The examples are provided in source-code form, allowing you to examine and learn how they were created. For nonprogrammers, IBM has programs such as Linkway and StoryBoard Live that allow you to control the M-Motion Video Adapter. You can also take advantage of the M-Motion adapter from ToolBook running under Microsoft Windows.

Cost

The educational cost of the M-Motion Video Adapter is approximately CDN$2000. For more information, call Terry Jones at 978-4924.

Commodore SL 386SX 20

David Sutherland
davids@gpu.utcs.utoronto.ca

If you asked the Information Centre for advice on buying a computer in the last several months, the chances are good that we suggested you look at the Commodore SL 386SX 20 computer which is available at the U of T Computer shop. We think it has a combination of price, features, and support that make it worth considering if you are looking for an economical computer for use in basic office or research functions such as word processing, simple calculations, and information storage. This article provides details on some of the features of the computer.

Software

Currently the SL 386SX 20 is shipping with MS-DOS 4.01 installed on the hard disk. This simplifies setting up the computer since there is no need to format the hard disk or create the DOS directory. Commodore expects to be shipping MS-DOS 5.0 sometime in late 1991. Upgrades from DOS 4.01 to 5.0 are currently available at most computer retailers and cost less than $100.

The (800 x 600 pixel) Super VGA (video graphics array) drivers that accompany the VGA card support only older versions of applications programs such as AutoCAD release 9, WordPerfect 4.2, Lotus 1-2-3 Release 2.01, and Windows 2.0. By press time, you will be able to obtain current drivers from Commodore separately.

Documentation

A compact and complete set of manuals accompanies the computer. There is a hardware manual, *Introducing the SL 386SX*, that describes setting up the machine, using the CMOS configuration utility, installing adapter cards, memory, and additional disk drives. The manual is well illustrated and there are diagrams showing jumper settings and locations. Commodore includes a reference manual for the VGA card and accompanying drivers.

The *PC Operations Guide* offers a quick introduction to using the computer. Topics include: using the keyboard; MS-DOS commands like DIR, COPY, and ERASE; tips on creating configuration files; using floppy diskettes; and trouble shooting.

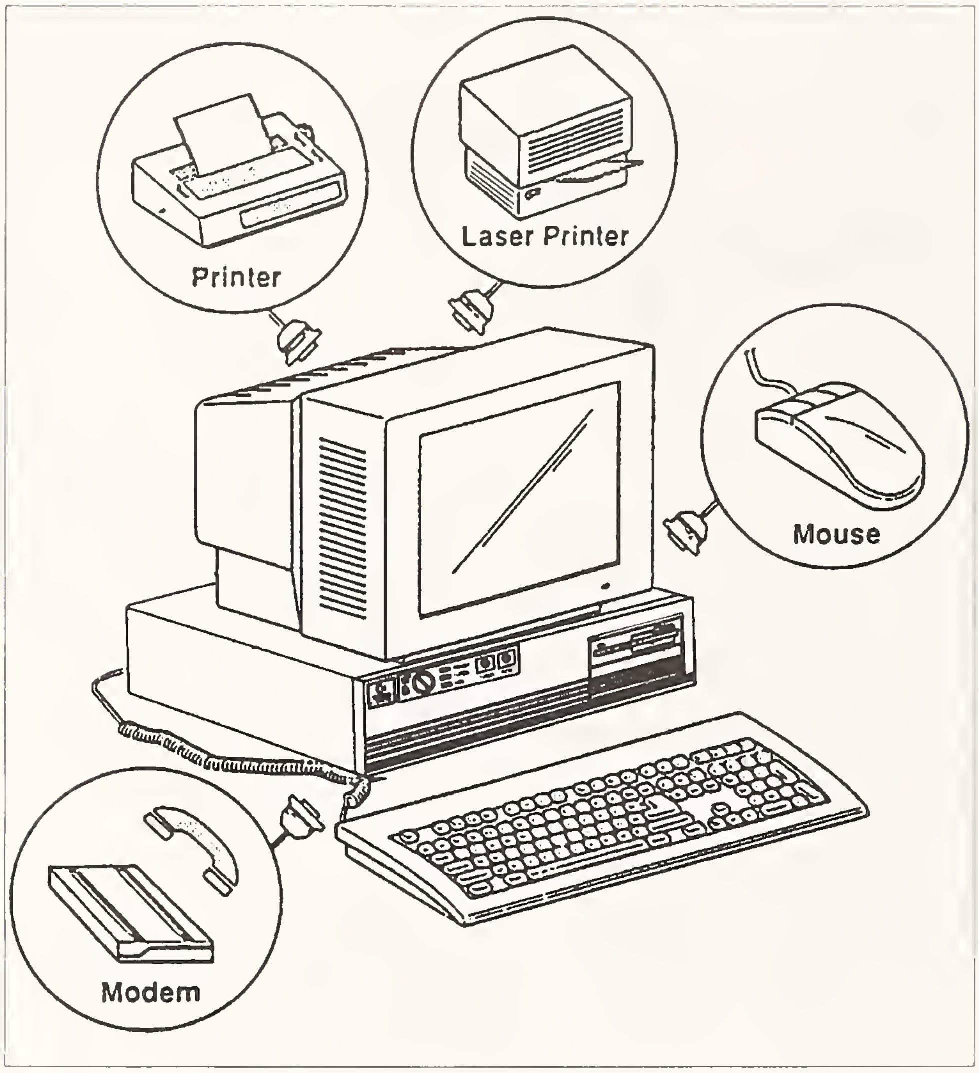
The standard MS-DOS, GW-BASIC, and MS-DOS SHELL manuals are also included in the package.

The technical features of the SL 386SX 20 computer are:

- 20 megahertz (MHz) 80386 central processing unit (CPU);
- 1 megabyte (MB) of random access memory (RAM);
- One parallel port, two serial ports, one mouse port;
- A 50MB or 100MB IDE hard disk;
- One 1.44MB floppy diskette drive;
- One 16-bit VGA card with 800 x 600 pixel resolution.

The expansion capabilities of the computer are:

- 5MB of RAM on the motherboard;
- One 80387SX math coprocessor;
- Two slots that support 16-bit full-length adapters;



The peripheral devices illustrated above can be connected to the SL 386SX.

- Two slots that support 8-bit half-length adapters;
- One 5.25-inch device bay and power connector.

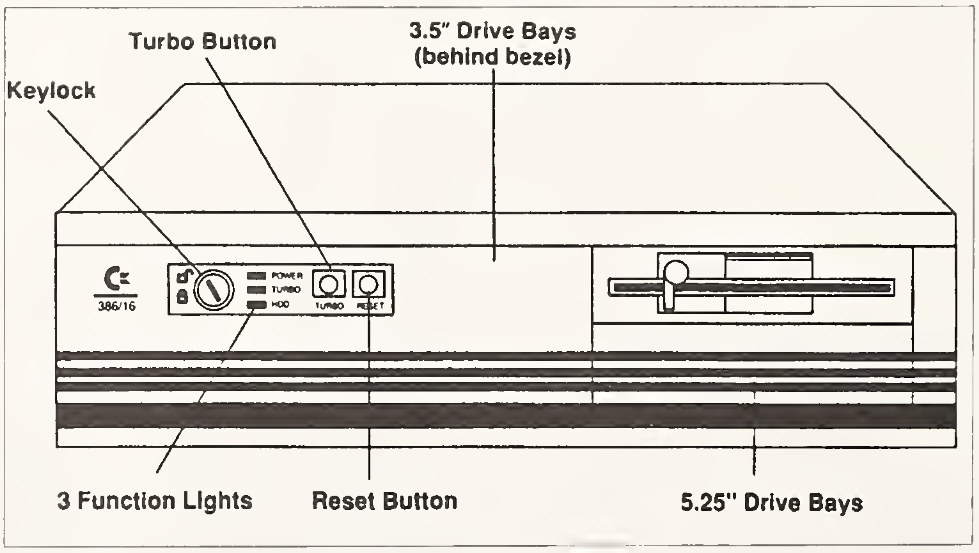
Performance and Compatibility

The computer is fully compatible with MS-DOS programs. We have run a wide range of applications on the machine for several months without experiencing any difficulties. We successfully attached an Hitachi CD-ROM player, DEST scanner, and Corel optical disk drive to the computer. We also installed the MS-DOS 5.0 upgrade on the computer.

In order to facilitate comparison of equipment reviewed in *ComputerNews* with equipment reviewed in commercial publications we ran the PC LAB's compatibility and performance test suite, Norton Utilities System Information program, and CoreTest disk speed test. This series of benchmarks provides an arbitrary measurement of a machine's capability. Readers should expect that practical experience with a specific application may or may not confirm the apparent differences between machines. (For a more detailed explanation of these benchmarks, see "Performance Benchmarks," page 21, in the July/August 1991 issue of *ComputerNews.*)

Windows 3.0

The basic SL 386SX 20 comes equipped with 1MB of RAM. This is not enough memory to run Windows programs effectively. Although the computer supports 256KB SIMM-type memory expansion, this limits the total memory on the motherboard to 2MB. The most efficient method of memory expansion is to use 1MB SIMMs which permit memory expansion from the original 1MB to 3MB or 5MB of RAM.



This illustration shows the parts of the SL 386SX.

With the additional memory, the SL 386SX 20 becomes a viable Windows workstation for word processing, spreadsheets, and occasional graphics applications. The lack of a high-resolution display and relatively slow speed of the CPU (compared to a 33MHz 486, for example) limit the effectiveness of the computer for intensive graphics work such as CAD or desktop publishing.

SAS

SAS installed without difficulty and the Testbase installation test program ran without any errors. Times for executing the Testbase program were 11 minutes 10 seconds with expanded memory, 13 minutes 32 seconds without expanded memory.

Test Results for the SL 386SX 20:

Norton Utilities System Information

CPU index:	16.5
Hard disk index:	5.4
Performance index:	12.8

CoreTest

Data transfer rate:	792.3 KB/sec
Average Seek time:	24.9 milliseconds

Networking

The SLSX was connected to the UTCS Ethernet using 3Com and Western Digital Ethernet adapters. We successfully logged into our Novell server, UNIX host, and IBM mainframe computer. The serial ports worked with LapLink, transferring files at 115 kilobaud.

Conclusion

Whether the SL 386SX 20 computer is the right machine for you depends on your requirements. The "slim line" design restricts the expansion capabilities of the machine. The VGA card has limited support for high resolution graphics with the supplied drivers. Some applications may require faster processors or larger hard disks.

We think the SL 386SX 20 has the minimum capabilities needed in a computer that will be used in general purpose office and academic computing for the next several years.

PC Magazine Laboratory Benchmarks Series Release 5.6

	SL 386SX 20MHz	IBM Model 70/25MHz	Compaq 486/25 25MHz
Processor Performance Tests:			
Instruction Mix - 8088	4.29	2.41	1.58
Instruction Mix - 80386	3.98	2.19	1.44
Integer Add	1.26	0.49	0.25
Integer Multiply	0.63	0.34	0.24
String Sort and Move	1.31	0.73	0.43
Prime Number Sieve	0.78	0.32	0.13
Floating Point Mix	7.86	4.01	2.36
Disk Performance Tests			
BIOS Disk Seek			
*Sequential	5.55	12.01	3.63
*Random	24.11	21.09	19.88
DOS Disk Access	21.64	26.62	14.42
DOS File Access (small records)	46.08	69.77	50.09
DOS File Access (large records)	6.20	6.47	3.74
Video Performance Tests			
Direct Screen Access	2.03	6.53	1.32
Teletype Without Scrolling	0.77	0.66	0.28
Memory Performance Tests			
Conventional Read	0.71	0.33	0.28
Conventional Write	0.72	0.33	0.17

*Speed measured in milliseconds. All other speeds measured in seconds.

dBASE IV 1.1:

A Good Combination of Interactive & Application Development Tools

There is a lot of confusion and misinformation concerning dBASE IV. As a result, some people on campus have chosen not to upgrade their current copy of dBASE III, or have returned to using dBASE III after some bad experiences with dBASE IV.

Ashton-Tate released dBASE IV version 1.1 last year and made it available as a free upgrade to version 1.0. Version 1.1 has proven to be very reliable and functional. Compared to dBASE III Plus, dBASE IV version 1.1 offers many substantial improvements. With the Control Centre, Report, Label, Query, and Form generators, non-programmers can create and use relatively sophisticated database applications. In this article we hope to address some of the concerns you may have about dBASE IV and indicate why it remains UTCS's primary supported MS-DOS database program.

Common Concerns about dBASE IV

"dBASE IV has Bugs"

Ashton-Tate, in its quest to get the long-delayed dBASE IV 1.0 to market, released a less-than-robust product. Problems with the forms generator and report generator, along with numerous smaller bugs, caused many users to continue to use dBASE III Plus. However, with the release of version 1.1, these problems have been corrected, and we feel that this version is as robust as any comparable product on the market.

"dBASE IV Won't Work on My XT"

Technically, all that is required to run dBASE IV version 1.1 is 640 kilobytes (KB) of Random Access Memory (RAM) and about five megabytes (MB) of storage space on a hard disk, requirements that many XT computers can provide. However, it is true that neither Ashton-Tate nor UTCS recommend using dBASE IV on an XT-class computer, and the issue is performance.

We became frustrated by the slow response of the program when used on an XT-class computer, and feel it is unfair to expect other people to use dBASE IV on slower computers. It is important to note, however, that other leading database programs, such as Paradox or FoxPro, also perform slowly on XT-class machines.

We understand that sometimes there isn't any money available for a new machine, but we think working with dBASE IV to develop a database application on an XT is still faster than writing a program in dBASE III. Database access is generally faster in dBASE IV than in dBASE III, thanks to the Multiple Index format and the command preprocessor.

"dBASE IV isn't the Best Program"

If you buy into the hyperbole found in most computer magazines, your life can become an endless quest for the perfect database program. Unfortunately, the media hype rarely addresses the practical problems of people who want to use their computers to do something useful.

The two qualities that make a database a useful tool to the average person on campus are ease of use and functional capabilities. Both these factors need to be evaluated in relation to the individual who will be using the program and the problem to be solved.

Ease of Use

Ease of use has two factors, the behaviour of the program and the individual using the program.

All of the major database programs consist of a program control facility (menuing system), and various tools that are used to create and access the various elements of a database application, such as data files, data entry forms, reports, and so on.

In our opinion, the dBASE tools used to design data entry forms, reports, and labels are easier to learn and use than those available in other programs, such as Paradox or FoxPro. Paradox does have a superior interactive Query system, but dBASE IV's Query facilities are perfectly acceptable.

While the Control Centre remains a "less-than-ideal" user interface, it is much easier to use than the dot prompt in dBASE III. For example, we now teach dBASE IV from the Control Centre, and have been able to increase the course content by 50% compared to when we taught from the dot prompt. The Control Centre is as easy to use as FoxPro's menus and windows. Paradox offers

David Sutherland
davids@gpu.utcs.utoronto.ca

a simpler menu system, but many tasks require multiple keystrokes to accomplish them.

In short, other programs do things differently, and none of them offer any spectacular improvements that would make the creation of a database system so easy that one would not need training or assistance.

This brings us to the second factor in ease of use, the individual user. Most people with previous dBASE III experience will make the transition to dBASE IV or FoxPro much more easily than to Paradox. Beginners are advised to take some courses before attempting to use any database manager. dBASE IV courses and books are much easier to find than Paradox or FoxPro equivalents. Naturally, we recommend that people starting out on a database project attend UTCS's own "Introduction to dBASE IV" class.

Capabilities

dBASE III's chief claim to fame was its programmability. With version 1.1, the programming functions have been extended by the addition of User Defined Procedures (UDP), User Defined Functions (UDF), conditional indexes, SCAN(), and so on. With these functions, a skilled dBASE programmer can create complex multi-table database applications.

Also available from Ashton-Tate is the "Control Centre Booster," an add-on product that enhances the Control Centre's ability to work with multiple database files. This makes dBASE more competitive with some of the multi-table facilities found in Paradox.

Many projects start small and grow. dBASE's programmability offers the capacity to accommodate requirements for additional functions in the future. The popularity of the dBASE language means that skilled programmers are more likely to be available for a project.

Making a Decision

There is no "perfect" database program that we can recommend. We think that dBASE IV is still the most suitable program for the majority of the people whom we meet on campus.

Microcomputer Short Courses

Irene Rosiecki
rosiecki@vm.utcs.utoronto.ca

UTCS offers various noncredit microcomputer courses to faculty, staff, and graduate students of the University of Toronto. These courses cover a number of software programs available for the PC or the Macintosh. Whether you will be typing a thesis on a word processor, or working with spreadsheets, databases, or desktop publishing, we may be able to help you get started.

Our class sizes are small to allow for much individual attention. Continuing support is available upon completion of a course.

The following is a list of the microcomputer courses taught at UTCS:

- Introduction to dBASE IV
- Introduction to Disk Operating System (DOS)
- Electronic Mail Seminar
- Excel on the Macintosh
- Introduction to FoxBASE+/Mac 2.0
- Introduction to HyperCard
- Introduction to Lotus 1-2-3
- Introduction to PageMaker
- ProComm Communications Seminar
- Introduction to SAS on the PC
- Intermediate SAS - Data Processing
- Intermediate SAS - Statistics
- SAS/Graph Seminar
- Microsoft Word on the Macintosh
- Introduction to WordPerfect 5.1
- Advanced WordPerfect 5.1 Topics

To find out about course dates and registration procedures, or to book a place in any of these courses, please contact Irene Rosiecki at 978-4565. Courses are filled on a first-come, first-served basis. The more popular courses fill up quickly, but waiting lists are maintained in case of cancellations.

DOS 5.0

David Sutherland
davids@gpu.utcs.utoronto.ca

Using DOS 5.0, we configured a 20MHz 386sx computer so that it could connect to a campus TCP/IP network, a Novell file server, and a locally attached 512 megabyte (MB) optical disk drive, and could provide 601 kilobytes (KB) of conventional memory for DOS application programs.

If you don't find this information exciting, you are not alone. The introduction of a new version of an operating system usually doesn't stimulate a lot of discussion from the legions who toil away with their word processors and spreadsheets.

Operating systems are the technical underpinnings of a computer and most people limit their contact with MS-DOS to starting a few programs and erasing files. But, because all the other programs depend on the operating system, changes and improvements to the operating system can have both a direct and an indirect influence on the capabilities of your computer.

MS-DOS 5.0 offers functional improvements in three main areas: ease of use, file management, and memory management.

Better Memory Management

Memory is a scarce resource on an MS-DOS computer. While some machines have sockets for up to 16 megabytes (MB) of memory on the motherboard, most MS-DOS programs will use only the first 640 kilobytes (KB) of memory (called conventional memory) and ignore any remaining memory. This can cause problems when you use a terminate-and-stay resident program (TSR), such as a print spooler, and also want to edit a large spreadsheet.

DOS 5.0 does several things to make the most out of the 640KB block of conventional memory available to DOS applications; it is smaller than DOS 4.01, and it can be configured to use very little conventional memory. DOS 5.0 has the ability to load most of itself into high memory, using the HIMEM.SYS driver (first used with Microsoft Windows) and the CONFIG.SYS command DOS=HIGH. Using these commands, DOS 5.0 also provides the ability to lead TSRs into high memory, freeing up even more conventional memory for DOS applications.

It is now possible to analyze the allocation of conventional memory using the improved memory command "MEM." Unfortunately, the process of analysis is tedious and technical, requiring a certain amount of experimentation. Most people will not have the experience or patience to fine tune their memory configuration to the point we described at the beginning of this article. Even so, with extra memory installed in a 80286 or 80386 computer, the default values used by DOS 5.0 can make available an additional 64KB of conventional memory.

Better File Management

Three new commands—UNDELETE, UNFORMAT, and MIRROR—promise to make life a little easier. In the past when you erased a file or formatted a disk, the information disappeared unless you were lucky enough to have a third party utility like Norton Utilities or PC-Tools. DOS 5.0 has incorporated into the operating system the ability to retrieve erased files and unformat formatted disks. While these commands are not as powerful as the current generation of third-party disk utilities, they work well enough to help people recover from an occasional accident.

The DIR (directory) command has been improved so that directory listings can be sorted by filename, extension, time and date, and size. DIR also can be used to show directories, hidden files, system files, archive status, and read only status.

Easier to Use

Easy Installation

Upgrading previous versions of MS-DOS used to mean backing up the hard disk, reformatting it with the new version of DOS, and restoring the files. With DOS 5.0, you are asked a few questions, reminded to back up your data (good thing to do even if you are not upgrading you operating system) and are prompted to insert diskettes. Along the way, the MS-DOS 5.0 upgrade program prompts you to insert a blank diskette. This diskette is used to create a backup of your old operating system. Included on this diskette is a program called UNINSTALL. This program is used to remove MS-DOS 5.0 from your hard disk and restore the previous version of the operation system.

When you restart your computer after the installation, DOS 5.0 is

The DOS shell programs, which are available from several aftermarket companies, attempt to provide some of the easy-to-use features that are found in GUIs without requiring faster processors or large amounts of memory.

loaded. All your existing applications are on the hard disk just where they used to be. DOS 5.0 has a facility called SETVER (set version) that is used to fool old programs into thinking that they are running under an older version of DOS. The installation program automatically sets up a default version list that can be edited or added to.

Keyboard Control

The MODE command has been extended with a CON: option, that is used to set the rate of key repeats and the delay time. Adjusting these parameters can affect how fast your cursor keys will scroll you through a document.

The DOSKEY program can be used to view, edit, and carry out MS-DOS commands that you have previously used. In addition you can create, run, and save command macros, which are lists of one or more MS-DOS commands stored in memory and which run much like batch programs.

Full Screen Editor

Sometimes you need to make changes to your computer's CONFIG.SYS or AUTOEXEC.BAT file when installing a new piece of software or hardware. Usually the installation instructions advise you to use a text editor like EDLIN to make the changes. If you have done this, you know that EDLIN is not a pretty place. DOS 5.0 remedies this by introducing a new text editor, "EDIT." EDIT is a full-screen editor that should be quite easy to use by anyone who is familiar with word processing programs like WordPerfect or Microsoft Word. EDIT creates standard DOS text files without any special formatting characters, so it is suitable for creating and changing configuration files like CONFIG.SYS and AUTOEXEC.BAT.

DOS SHELL

Most people find working with the MS-DOS command-line user interface confusing, if not down right scary. The Macintosh computer eliminates the command line completely and provides a graphical user interface (GUI), which many people find easier to work with. GUIs are available on IBM compatible computers with programs like Windows 3.0, OS/2, and Geoworks.

The DOS shell programs, which are available from several aftermarket companies, attempt to provide some of the easy-to-use features that are found in GUIs without requiring faster processors or large amounts of memory. While some people swear by their favourite DOS shell program, in general we have found them to be of limited benefit to most people.

The new DOSSHELL program available in DOS 5.0 is typical of this sort of program and it does offer some useful features: graphical presentation of directory structures, and the ability to quickly switch between multiple applications.

Improved Documentation

The manual is easier to understand than previous versions. In addition to the standard command reference section, there are instructional chapters that provide information about using the operating system. Topics covered include:

- Command-Line Basics and Advanced Techniques;
- MS-DOS Shell Basics and Customizing;
- Working with Files and Directories;
- Customizing and Optimizing the System.

Practical Experience

We installed DOS 5.0 on an 8MHz Packard Bell 80286 computer and a 20MHz Commodore 80386SX computer. We found that while the 80386 computers show the biggest benefit in terms of freeing conventional memory, the installation of DOS 5.0 seems to be a practical and low-cost method of extending the life of old 80286 AT-style machines.

The installation process is very easy and requires no technical knowledge. All you have to do is provide a blank floppy diskette, run the install program, and follow the instructions on the screen. We had no problems using the UNINSTALL program to restore the previous version of the operating system on our test computer.

We were surprised to find that the Novell network shell "XMSNET5" will not work with the HIMEM.SYS extended memory manager. As a result, on the SLSX 20 we used the LOADHIGH command to install the Novell network shell NET5 in the upper memory block. Owners of 80286 computers will have to wait until there is a version of the Novell network shell that works with the HIMEM.SYS memory manager before they can take advantage of the available extended memory. (Novell has corrected the flaws, and now provides a network shell that works with the LOADHIGH command.)

Packard Bell PB-286

Our PB-286 was running DOS 4.01. It had 640KB of conventional memory, and 512KB of extended memory that wasn't being used. This machine is connected to the UTCS Novell network and TCP/IP network. After installing the basic DOS 5.0 system, the MEM command showed 628KB of conventional memory available for programs. When we installed the network drivers, the available conventional memory was reduced to 565KB. This compares favourably with the 490KB of conventional memory that was available under DOS 4.01.

Since all 80286 computers lack the ability to support the LOADHIGH command, we were unable to install the network drivers in the upper memory area.

Commodore SL 386SX 20

The SLSX 20 was configured with DOS 4.01, 640KB of conventional memory, 4096KB of extended memory, and 384KB of shadow RAM which is used to speed up the system BIOS. This machine is connected to the UTCS Novell network and TCP/IP network. Windows 3.0 is installed on the machine.

The initial DOS 5.0 installation resulted in 564KB of conventional memory available. After considerable experimentation using the LOADHIGH command to install the network drivers in upper memory, we were able to get 627KB of conventional memory available for application programs. This compares with the 499KB of conventional memory available under DOS 4.01.

Summary

Should you spend the money and upgrade your version of DOS? That depends on the type of computer you have, and what you are using it for.

In general, if you are using a local area network like Novell and can install extended memory in your machine, you will find DOS 5.0 useful. If you can install extended memory in your computer, and you use Windows 3.0 programs like PageMaker, CorelDRAW, or Excel, you will appreciate the additional conventional memory that DOS 5.0 provides.

However, extended memory cannot be installed in the PC- or XT-class computers; if you own one of these machines, you will not be able to take advantage of the improved memory management DOS 5.0 provides. If you are just looking to make your computer easier to use, you might want to investigate some third-party DOS shells rather than buying DOS 5.0.

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Types of Memory

Configuring memory can be one of the most confusing aspects of setting up your computer. All programs want conventional memory, some programs like extended memory, other programs like expanded memory. A few programs like any type of memory. Here is a very general and decidedly non-technical presentation on the meaning of these terms.

The first thing you need to know is that there is really only one kind of memory in your computer. The words conventional, extended, and expanded specify how the memory is to be used. The reason memory is used in different ways can be explained following the evolution of the original IBM PC to the current generation of 80486 workstations.

Memory is used to store both the program instructions and data so that the central processing unit (CPU) of the computer can quickly execute the instructions and manipulate the information. The instructions and data are organized in memory into small units of storage called bytes. Each byte has a unique address which is selected electronically by wires or lines that lead from the CPU to the memory chips.

The 8088 CPU used in the IBM PC was equipped with enough lines to select 1MB worth of memory. When the programmers designed the original MS-DOS operating system they divided the 1MB memory area into two sections. The first section is used by applications programs like word processors and spreadsheets. They decided to provide 10 times as much memory in the MS-DOS computers as there was in the Apple II computer. So the applications area was set at 640KB of memory. That left 384KB of memory for the MS-DOS operating system to use for itself and for the installation of peripheral devices like display adapters, network adapters, and so on.

The 80286 CPU used in the AT-style computers was equipped with more memory address lines, enough to address 16MB of memory. There was also a whole new set of computer instructions that could be used to access this additional memory. When this new set of instructions was operating, the CPU was said to be working in "protected mode." The old set of instructions that the PC and XT computers used was called "real mode."

IBM decided to call the additional memory that could be installed in their AT computers "extended" memory. This extended memory could only be accessed by programs that worked in protected mode. For people who did their own custom programming, this made a lot of sense.

Unfortunately, most customers used off-the-shelf software from large companies like Lotus, Microsoft, and WordPerfect. These large companies didn't want to split their market into two groups, the lucky ones with ATs who could run the latest software running in protected mode, and the poor cousins with PC and XT-class machines who could only run real mode programs.

The software companies devised a method whereby the additional memory could be added to an existing PC or XT-class computer. In this system, a small window (typically 64KB) is created within the 1MB memory address space which is available to programs running in real mode. Real mode programs can ask a memory manager to move information into this window. The memory manager controls its own bank of additional memory. The bank of memory controlled by the memory manager is called "expanded memory." The 1MB of memory used by real mode programs is called "conventional memory." By moving information stored in expanded memory in and out of the window in conventional memory, real mode programs could be provided with additional memory capacity.

Most DOS applications work in real mode. Some of these programs have the ability to use expanded memory if it is available. Expanded memory can be provided on PC and XT by installing an expanded memory card and installing a program called an expanded memory manager.

Computers equipped with the 80286 CPU can use the combination of an expanded memory card and an expanded memory manager program. These computers can also use a special type of expanded memory manager program which runs in protected mode and use the existing extended memory installed in the computer.

On 80386 computers, protected mode expanded memory programs are the most effective method of providing expanded memory.

Some DOS applications, like AutoCAD or Lotus 1-2-3 version 3.0, switch the CPU into protected mode and use extended memory directly. Unfortunately, these programs frequently conflict with expanded memory managers, since both programs are running in protected mode and are trying to use the same extended memory that is installed in the computer.

In order to manage these conflicts and pave the way for several programs running at the same time, the software industry has created additional types of memory such as VCIP, XMS, and DPMI. But that's a subject for another article.

PageMaker 4.01

Let me begin by saying that where PageMaker for the Macintosh is concerned, I am completely and unrepentantly biased. I used the program in its early days, when I had to play musical diskettes with my floppy disk drives because the program diskettes were copy protected, and the copyright gremlins that resided therein commanded me to insert the master diskette over and over again. I remember life without style sheets, and when the maximum number of pages in a file was 128. I liked it anyway.

Users tend to remember best the major upgrades to PageMaker because of the increased power and capacity to lay out and assemble documents with ease and precision. The smaller upgrades, however, are not to be dismissed lightly, as they usually contain fixes and enhancements that will make your work easier, and also provide supplementary documentation that clarifies features that might have been explained insufficiently (or not at all) in the manuals for the major release. Which brings us to PageMaker 4.01.

Aldus released version 4.01 in early March this year. If you own and have registered a copy of PageMaker 4.0, Aldus should have shipped (or shortly will ship) you a copy of the 4.01 upgrade. If you have not yet received yours, give them a call to let them know you are still waiting. If you are considering purchasing the program, you will have to ask the vendor which version they are selling in the store; some will have the newer one in stock. If you end up buying version 4.0, a call to Aldus will get you a free upgrade.

Maureen Monné
monne@vm.utcs.utoronto.ca

Story Editor

You can now import text from existing PageMaker publications (version 4.0 and higher). Before you import a story, you have the choice of previewing the text if you wish. You can import the whole piece, or copy and paste the sections you want. It is worth knowing that character formatting is retained when you place the whole story, but it is lost when you copy and paste selected parts.

A new smart ASCII filter accurately translates the PC character set to the Macintosh character set.

The Find and Change commands now let you look for and/or replace index entries and inline graphics markers.

Book Command

I didn't use this feature until version 4.01. With the Book command, you create a book list in which you organize and assemble a publication using separate files; you can print all the files in the list from one open file. *ComputerNews* is made up of several files, but I didn't bother organizing it with the Book command because it could not repaginate the whole publication for me when I added or deleted pages from individual files. Now, however, this feature will repaginate your document. (Although the release notes don't tell you this, when you change the order of the files you have to open up the new first file in your book list, open the Page setup dialog box, and tell it to start with page one. Otherwise, your publication will be numbered commencing with the existing first page number of the new first file. It does not automatically reset itself to page one.) There also is a way of sequentially printing files in which the pages have different orientations (i.e., one file has tall pages, another has wide pages), thus saving you the aggravation of having to open and close them over and over.

PageMaker does not repaginate your publication until you perform a "book" operation, such as creating an index or generating a table of contents. I don't normally use these features, so I have to fool the program to persuade it to renumber my pages. When I want to update my page numbering, I select the Create TOC command under the Options menu, and click the text icon in the pasteboard area when the program has finished searching the files in the book list for table of contents items. Although I have not marked any items in any of my files to be used in a table of contents, the act of performing the search is enough to satisfy PageMaker and cause the page numbers to be updated.

A Restart page numbering option in the Page setup dialog box allows you to begin numbering again in any file that is in the book list. This is handy if you have, for instance, an introduction or index that starts with page one, and you also want the main body of your publication to start with page one. You can choose to have all files after the first one start with an even-numbered page or an odd-numbered page should the design of your publication call for this. Where necessary, PageMaker will insert a blank page to allow this type of page numbering to work properly.

I feel it is important to mention that, initially, book printing did not work correctly for me. Yes, PageMaker printed the entire book from one open file. But it also indulged in some whimsical font substitutions that left me scratching my head. I was the puzzled recipient of one eye-popping page on which Cairo supplanted Times Roman. When I printed the same page from its own file, however, it was fine.

A call to Aldus customer support provided a speedy remedy. When I described the problem I was having, they immediately sent me a new set of upgrade diskettes, which arrived six days after I placed the call. I am happy to report that I can now print a book without font problems, and happier to disclose that the service I received was first rate.

New Save Options

If you use PageMaker regularly, you will be aware that it is notorious for increasing the file size every time you save changes to your document. Until recently, the only way to reduce the size of the file was to choose Save as from the File menu and replace the document with one of the same name. Now, however, you can choose Faster or Smaller as your save option in the Preferences dialog box (Preferences is under the Edit menu). Faster, the default setting, works the same as the Save command to which you are accustomed. Smaller works in the same manner as Save as. Smaller takes a little longer than Faster, so you will have to decide what suits you best.

Step-and-repeat Power Pasting

Have you ever tried to draw a series of equally-spaced lines in PageMaker? Trying to keep the spaces, line lengths, and starting positions consistent can be an exercise in exasperation. Now there is a trick that allows you to do this quickly and with precision (and will impress your colleagues, to boot!). The procedure is simple. First draw a horizontal line, select the line weight you want, and position it where you want it to appear on the page. Select the line with your pointer tool if it is not already selected, and choose Copy from the Edit menu. Hold down your Option key and choose Paste from the Edit menu. (If you prefer using keyboard short cuts, you can press <Command> + <Option> +<V> .) When you paste while holding down the Option key, PageMaker pastes the copy right on top of the original. Select the copy you have just made, and drag it down until you have the amount of space you want between them. Hold down your Shift key while you are doing this if you want to constrain horizontal movement. When you release your mouse button, PageMaker will remember the amount of space you have created between the two lines. While you hold down your Option key, choose Paste again (and again, and again), and PageMaker will continue to paste lines with the same amount of space between them as you specified for the first two.

Although this example tells you to draw a horizontal line and move it down, you can power-paste any line vertically and diagonally as well. You can also paste text or graphics using the same technique.

Performance

Users have been complaining for years that PageMaker is too slow. Version 4.01 contains some fixes that have accelerated it. For instance, it now takes less time to place text files because PageMaker no longer counts the number of characters in the incoming text. If you are working in a dialog box and the page under it has a graphic on it, PageMaker saves a bitmapped version of the graphic beneath the dialog box, thus eliminating time-consuming screen redraw (this is true of most dialog boxes, but not all). Startup time is faster, even if you have a lot of fonts installed in your system.

About the Instructions

PageMaker 4.01 comes with release notes that explain how the new enhancements work. I was pleased to see included a list of undocumented keyboard short cuts, plus some tips to help you along. Normally you have to pore over computer magazines or expensive “How to Master PageMaker” books in order to learn the tricks the “experts” use. The lists are not exactly exhaustive, but they are a start.

The release notes explain clearly, although not always thoroughly, how the new features are supposed to work. I had to make a second call to customer support when I ran into difficulty after I rearranged files in a book list and tried to print a repaginated document, assuming it would start with page one. While I have no complaints about the quality of the customer support, I feel it would have been preferable to mention that renumbering pages when you reorder files requires user participation beyond merely generating a table of contents.

Conclusions

Basically, I feel that PageMaker’s predominantly sound performance is ample compensation for the occasional difficulties I encountered. The program is like an old friend; with time the relationship deepens and becomes more complex, but the characteristics that first endeared it to you are still there.

Statistical Software Updates

Sandra Gardner
sgardner@vm.utcs.utoronto.ca

SYSTAT NEWS

UTCS recently received a new network version of SYSTAT 5.1. The new version requires a Macintosh network with a network server running AppleShare 2.0 or compatible network software. To use this network version, you will need a networked Macintosh with at least two megabytes of Random Access Memory (RAM), running Macintosh System 6.0.2 or higher. The network version is available for $29 per machine on the network running SYSTAT, minimum two machines.

There are two versions of Network SYSTAT, a version for Macintosh computers with a coprocessor, and a version for Macintosh computers without a coprocessor. If your network has a mixture of computers with and without coprocessors, you should install both versions of SYSTAT on your network server.

Please contact the UTCS Information Office at 978-4990 for information about how to obtain a site license.

SAS/PC NEWS

SAS Institute Inc. has recently released PROC PHREG which performs regression analysis of survival data based on the Cox proportional hazards model. This procedure will also allow time varying covariates to be added to the model. If you have SAS/BASE and SAS/STAT already installed (and if you have renewed your UTCS SAS/PC license), you may add PROC PHREG to your installation of SAS/PC with no extra cost. Please bring one formatted 3.5-inch diskette (double density or high density), or one formatted 5.25-inch (high density), or two formatted 5.25-inch (double density) diskettes to the UTCS Information Office at 4 Bancroft Avenue, Room 201, to obtain a copy of the software. Installation instructions will be provided. At the time of writing, SAS Institute provides no documentation for sale. There is, however, an extensive document provided as a text file on the software diskette. Please call Sandra Gardner at 978-5128 if you have any questions about this new procedure.

Campus-wide License for IMSL Products

(UNIX Workstations and PCs)

Andrzej Pindor
apindor@vm.utcs.utoronto.ca

UTCS is now offering an IMSL site license for DOS- and UNIX-based machines. For DOS machines, the site license covers the three-part FORTRAN subroutines library (MATH, STAT, and SFUN) described under item 1 below. For UNIX machines, the products include the following:

1. FORTRAN Library

The FORTRAN Library consists of three parts: a MATH library, a STAT library, and an SFUN (special functions) library. Altogether there are over 900 routines in version 2.0 of the library, covering the following areas:

MATH Library

- Linear systems;
- Eigensystems analysis;
- Interpolation and approximation;
- Integration and differentiation;
- Differential equations;
- Transforms;
- Nonlinear equations;
- Optimization;
- Basic matrix/vector operations;
- Utilities.

STAT Library

- Basic statistics;
- Regression;
- Correlation;
- Analysis of variance;
- Categorical and discrete data analysis ;
- Nonparametric statistics;

- Tests of goodness of fit and randomness;
- Time series analysis and forecasting;
- Covariance structures and factor analysis;
- Discriminant analysis;
- Cluster analysis;
- Sampling;
- Density and hazard estimation;
- Survival analysis, life testing and reliability;
- Multidimensional scaling;
- Random number generation.

SFUN Library (Special Functions)

- Fundamental functions;
- Trigonometric and hyperbolic functions ;
- Exponential integrals and related functions;
- Gamma function and related functions;
- Error function and related functions;
- Bessel functions;
- Bessel functions of fractional order;
- Kelvin functions;
- Elliptic integrals;
- Weierstrass elliptic functions;
- Miscellaneous functions ;
- Probability distribution functions and inverses.

2. Exponent Graphics

This is a flexible, fully FORTRAN-callable system that provides powerful capabilities for creating high-quality graphics.

3. C Base Library

The C Base Library is a collection of IMSL's most requested numerical functions, covering a broad variety of problems, from linear systems of algebraic equations to the addition of complex numbers.

4. IMSL Interactive Document Facility

IMSL's Interactive Document Facility provides online access to the essential printed documentation for IMSL Libraries subroutines. This can be used in the place of manuals.

5. Environment and Installation Assurance Test

This test verifies proper installation of IMSL libraries.

Costs of the Site License

The site license consists of a registration fee (CDN$588) which helps cover the startup fee for the installation media (tapes and cartridges) of IMSL products for specific environments, as well as one year of technical support from IMSL, including free upgrades. Each user wanting to install an IMSL product on his/her workstation also will pay a one-time fee on a per product basis. The fees depend on the product and whether the corresponding UNIX machine is a Class IV B (single-user) machine or a Class IV A (server). For example, the fee for the FORTRAN Library is CDN$565 for a single-user UNIX machine and CDN$935 for a UNIX server. The fee for DOS machines (Class V) is CDN$195. (Note that the cost of an individual UNIX license for the FORTRAN Library alone is US$4100. See the chart below for the complete list of products and fees under the UTCS site license.) Documentation can be obtained by ordering it through the UTCS Information Office. Upgrade support for subsequent years may be obtained for an additional fee, only if there is sufficient interest.

License fees for the products described above are:

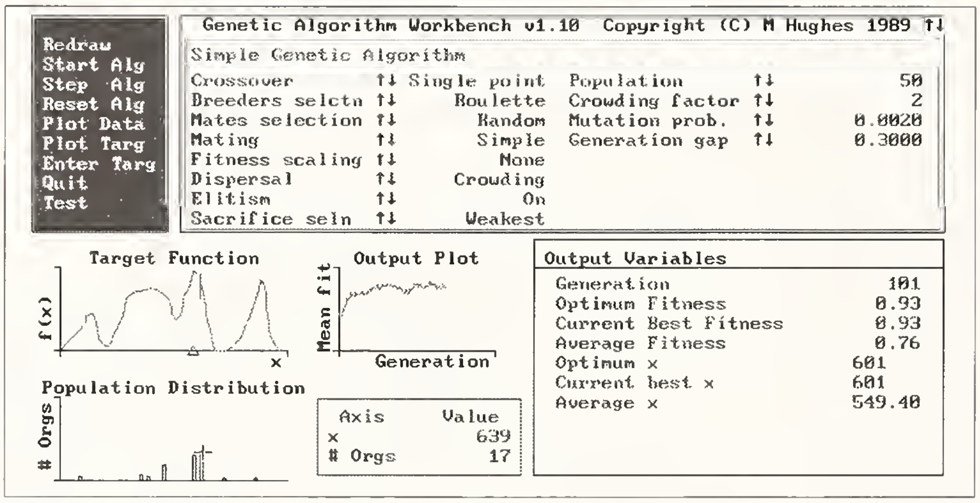
	UNIX Class IV B (single-user)	UNIX Class IV A (server)	DOS Class V
MATH, STAT, SFUN Libraries	$565	$935	$195
Exponent Graphics	$285	$475	Not available
C Base Library	$265	$445	Not available
Interactive Documentation Facility	$87	$140	Not available
Environmental Installation and Assurance Tests	$87	$140	Not available

(Above prices are in Canadian dollars.)

To obtain a registration form or for more details about the administration of the site license, contact Evelyn Ward at 978-4990. For details about the capabilities of the IMSL software, contact Andrzej Pindor at 978-5045 or send electronic mail to *pindor@gpu.utcs.utoronto.ca.*

Genetic Algorithm Workbench

Andrzej J. Pindor
apindor@vm.utcs.utoronto.ca



```
Genetic Algorithm Workbench v1.10  Copyright (C) M Hughes 1989 ↑↓
Simple Genetic Algorithm
Crossover         ↑↓ Single point  Population       ↑↓        50
Breeders selctn   ↑↓     Roulette  Crowding factor  ↑↓         2
Mates selection   ↑↓       Random  Mutation prob.   ↑↓    0.0020
Mating            ↑↓       Simple  Generation gap   ↑↓    0.3000
Fitness scaling   ↑↓         None
Dispersal         ↑↓     Crowding
Elitism           ↑↓           On
Sacrifice seln    ↑↓      Weakest
```

```
Axis        Value
x             639
# Orgs         17
```

```
Output Variables
 Generation                  101
 Optimum Fitness            0.93
 Current Best Fitness       0.93
 Average Fitness            0.76
 Optimum x               601
 Current best x          601
 Average x                549.40
```

Figure 1 shows a screen display from the Genetic Algorithm Workbench program.

A genetic algorithm is an optimization method for complicated functions of very many variables. The idea of the algorithm is based on our present understanding of how evolution works, i.e., how nature optimizes the design of living things. The genetic algorithm is used to solve difficult problems in a variety of areas, such as improving the design of turbine blades, mechanical structure optimization, gas pipeline management, classifying forensic evidence, identifying insurance risks, and many others. Since the procedure is derived from observing nature, however, it uses biological terminology. The purpose of the **Genetic Algorithm Workbench** program is to allow experimentation with different types of genetic algorithms, i.e., different selection schemes, different breeding mechanisms, effects of population size, and so on.

Very briefly, the algorithm works as follows: you take a function of many variables which you want to optimize in some sense (minimize, maximize, or whatever). First, you generate (perhaps randomly) a certain number of trial solutions. These trial solutions are called organisms, and the set of solutions is called a population. Next, you check how these organisms perform on the function, i.e., check their "fitness." On the basis of certain criteria, you select a portion of them for further work. To maximize a function, you might, for instance, choose the top half of the organisms. Then you combine the selected solutions in some way to produce a new set. This process is called breeding and results in a new population, preferably of the same size as the old one. The whole process is then repeated until you find solutions (organisms) with a satisfactory fitness. (For a detailed description see: Goldberg, D.E. *Genetic Algorithms in Search Optimization and Machine Learning.* Addison-Wesley, 1989.)

You control the program entirely with a mouse, which is used in three ways: 1) to choose an item from the commands menu; 2) to change the algorithm parameters; and 3) to draw a target function manually. When the program is executing, it attempts to maximize the target function.

Figure 1 shows an example of a screen display. The window on the left side of the upper half of the screen is the general commands menu. The window in the upper right half of the screen is the Algorithm Control Chapter. It has several pages that let you control different aspects of the algorithm. Some general program-controlled variables are set on the second screen (i.e., "page"), which may be accessed by pointing to the upper right hand corner of the screen you see in *Figure 1* and pressing the mouse button. This procedure is described in detail in the manual.

The Workbench program comes with a manual which provides a general description of the genetic algorithm and details all the aspects of the algorithm which you can experiment with using the program.

The Genetic Algorithm Workbench was written by Mark Hughes of Cambridge, UK. The author permits free distribution, provided that certain criteria are met. If you are interested in obtaining the program, contact Andrzej Pindor at 978-5045.

System Requirements:
IBM PC/XT/AT or compatible;
EGA display;
Microsoft-compatible mouse;
MS-DOS version 3.3, but should work on most versions of MS-DOS and PC-DOS.

Scientific Software Survey

Andrzej Pindor
apindor@vm.utcs.utoronto.ca

For the last two to three years I have been writing articles for *ComputerNews* describing various scientific and engineering packages. Many of these packages have been made available at UTCS for examination or distribution (public domain or shareware). Whether this service is going to continue depends on the need for it. If you are interested in having the service continued, please complete the short questionnaire below and return it to me at University of Toronto Computing Services, Room 202, 4 Bancroft Avenue, Toronto, Ontario, M5S 1A1.

Scientific Software Survey

I would like *ComputerNews* to continue reviewing scientific/engineering software.
Yes ☐ No ☐

I have used the information provided in these reviews to purchase software.
Yes ☐ No ☐

Please name the package(s): ______________________________

I have acquired public domain/shareware software described in *ComputerNews*.
Yes ☐ No ☐

Please name the package(s): ______________________________

Name ______________________________

Department ______________________________

Position ______________________________

Microcomputer Scientific Software at UTCS

Andrzej J. Pindor
apindor@vm.utcs.utoronto.ca

During past several years, I have reviewed in *ComputerNews* a number of microcomputer software products of interest to scientific and engineering applications. Below I present a summary of the products that are available at UTCS either for examination (in full or demo version) or for distribution (licensed or Public Domain/Shareware). The products are organized in the following categories:

1. General packages for numerical calculations
2. Symbolic manipulation packages
3. Equation solvers
4. Software for analysis of dynamical systems
5. FORTRAN libraries
6. Graphics packages
7. Other

For each product I also provide the *ComputerNews* issue numbers to indicate where the product was reviewed or mentioned, and the computer type (PC or Mac) the product runs on.

Name	Category	*ComputerNews* issues	Availability and Status	Computer type
GAUSS 2.0	1	246, 251, 252 259	full copy examine	PC
MathCAD 2.5	1	248, 252, 256 259, 271	full copy	PC *1
PC MATLAB 2.02	1	248	demo copy examine	PC *1
ASYST	1	260	demo copy examine	PC
MATRIX 5.5	1	266	full copy examine	PC
mu-Math 83	2	251	full copy examine	PC
Algebraic Computations	2	252	Public Domain	PC
Derive 2.06	2	253, 260, 271	full copy examine	PC
Mathematica 1.2	2	254	demo copy *2 examine	PC, Mac

Name	Category	*ComputerNews* issues	Availability and Status	Computer type
Theorist	2	269	full copy examine	Mac
Eureka: The Solver 1.01	3	250	full copy examine	PC, Mac
Solver-Q	3	255	full copy examine	PC
Chico Solver 2.08	3	265, 270	full copy examine	PC
Dynamical Software	4	252	demo copy examine	PC
Dynamical Program	4	270	full copy examine	PC
Chaos in the Classroom I: Maps and Bifurcations	4	258	license	PC
Chaos in the Classroom II: Fractals and Julia Sets	4	264	full copy examine	PC
LINPACK	5	248, 250	Public Domain	PC, Mac
EISPACK	5	248, 250	Public Domain	PC, Mac
MINPACK	5		Public Domain	PC, Mac
PC Scientific FORTRAN Subroutine Library *3	5	251	demo copy examine	PC
NSWC Mathematical Library	5	267	Public Domain	PC, Mac
GRAFTOOL 2.1	6	264	full copy examine	PC
3DSUR	6	267	Shareware	PC
SURFMODL	6	267	Public Domain	PC
RPlot 1.00	6	269	full copy examine	PC
EasyPlot 2.0 demo copy	6	271	full copy examine	PC

Numerical and Scientific Software

Name	Category	*ComputerNews* issues	Availability and Status	Computer type
CHEMICAL (creates 3D models of molecules)	7	252	Public Domain	PC
GAMS (optimization package)	7	258	full copy examine	PC
CURVE^{fit} 1.0 (curve fitting program)	7	258	full copy examine	PC
ASYSTANT (ASYST + data acquisition)	7	260	demo copy	PC
CMPCALC3 (complex numbers calculator)	7	261	free	PC
CASim 1.0 (cellular automata modeller)	7	266	full copy examine	Mac
NCSA DataScope 1.1 (scientific visualization)	7	268	Public Domain	Mac
NCSA Image 2.1.2 (scientific visualization)	7	268	Public Domain	Mac
NCSA Layout (presentation software)	7	268	Public Domain	Mac
Spyglass TRANSFORM 2.0 (scientific visualization)	7	268	full copy examine	Mac
Spyglass VIEW 1.0 (scientific visualization)	7	268	full copy examine	Mac
Spyglass DICER 1.1 (scientific visualization)	7	268	full copy examine	Mac
Spyglass FORMAT 1.01 (presentation software)	7	268	full copy examine	Mac
Genetic Algorithm Workbench 1.0	7	272	Shareware	PC

*1 Macintosh versions of these programs are also available, but we do not have them at UTCS.

*2 At UTCS we have a full version of Mathematica on a Sun-3.

*3 This product consists of several libraries (FFTLIB, FITLIB, MINPACK1-LIB, QUADLIB, and SPARSGEM), available for various compilers. Each library comes with a user's guide and tutorial, an extensive reference manual, and "skeleton files" which facilitate the coding of programs calling the library routines.

If you are interested in any of these programs, you are welcome to call Andrzej Pindor at 978-5045.

Consulting and Enquiries

Erindale College	Joe Lim	ER2035	828-5311
Information Office	Evelyn Ward	BC201	978-4990
Account & Access Code Enquiries	Jason Pante	BC101B	978-7148
IBM & Macintosh Maintenance	Rosi Derka-Tseu	BC103	978-1299
Tape Library (Academic Services)	Susan Kovago	MP368	978-7319
Tape Library (Administrative Services)	Miranda Fong	MP368	978-6693
Communication, Networking & Hardware	Rosi Derka-Tseu	BC105	978-7087
UTCS Noncredit Short Courses	Irene Rosiecki	BC217	978-4565

Consulting & Advising Services:	978-HELP
CMS, and GP UNIX userids:	ADVISOR
CMS Userid for mail problems:	POSTMSTR
Network Operations Centre	978-4621
System Status Enquiries (GP UNIX)	978-4318
System Status Enquiries (IBM)	978-7393
Interactive Services 300 (bps)	978-3959
Interactive Services 1200 (bps)	978-3959
Interactive Services 2400 (bps)	978-7239
Interactive Services 9600 (bps)	978-7220

UTCS Directory

Director:	Dr. Warren Jackson	BC118	978-8948	wcj@vm.utcs.utoronto.ca
Associate Director, Operations:	Eugene Siciunas	BC116	978-5058	eugene@vm.utcs.utoronto.ca
Managers:				
Computer & Network Operations Support	Dr. Bob Chambers	MP350	978-7092	
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Facility Management Support	Ms. Vera Cabanus	MP350	978-7107	vcabanus@gpu.utcs.utoronto.ca
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Network Development & Support	Norman Housley	BC121B	978-4967	norman@vm.utcs.utoronto.ca
Administration & Information Services	Ron Vander Kraats	BC121A	978-4428	rvk@vm.utcs.utoronto.ca

Legend:
BC = Bancroft Building
ER = Erindale
MP = McLennan Physical Labs

* NetNorth/BITNET/EARN

Terminal & Advising Sites

Names and Locations

Central Advising Office (CAO), 978-HELP
Engineering Annex (EA), 11 King's College Road, Room 107B
Erindale College (Erin), 828-5339, 3359 Mississauga Road North, Erindale Campus, Rooms 2037, 2045
Ramsay Wright, 25 Harbord St., Rooms 211, 213
Robarts, Robarts Library, 130 St. George St., Room 1061A
Sidney Smith (Sidney), 100 St. George St., Room 1071, 2105
St.Michael's College, 121 St. Joseph St., Room 107
Trinity College, 6 Hoskin Ave., Room 024
Victoria University, 73 Queen's Park Cres., 1st floor

Access Hours

Sites	Hours of Access				Restrictions*	Advising
	Mon-Thurs	Fri	Sat	Sun		
CAO	12:00-18:00	12:00-18:00	closed	closed	Research	978-HELP
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Erin (2045)	9:00-22:00	9:00-22:00	12:00-18:00	12:00-18:00	none	Rm 2005
Ramsay Wright	7:00-21:00	7:00-18:00	closed	closed	Undergrads	No
Robarts	8:30-24:00	8:30-24:00	9:00-22:00	13:00-22:00	None	978-HELP for Research
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Trinity	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	None	978-HELP for Research
Victoria	8:30-21:00	8:30-21:00	8:00-13:00	8:00-13:00	None	978-HELP for Research

Sites	Advising Hours
CAO	Monday through Friday, 12:00 - 18:00
Erin	Monday through Friday, 09:00 - 22:00

Computer and Printer Access

Sites	PACX	CDF/PC	CQUEST	Printers
EA	Y			Y*
Erin	Y			Y*
Ramsay Wright			Y	Y**
Robarts	Y	Y		Y*
Sidney		Y	Y	Y**
St.Michael's	Y	Y		Y*
Trinity	Y	Y		
Victoria	Y			

(Y=yes, N=no)
*** Public Printers **Site Only**

UTCS Site Licenses

UTCS administers a number of software site licenses available to the University of Toronto community. (Usually, this means faculty, staff, and graduate students, though some licenses apply to undergraduate students also. See "Restrictions" in the table below.) The licenses provide a variety of software at much-reduced cost. The majority of the licenses must be renewed each year. Most are terminated when you leave U of T.

Each license has a contract that you must complete. It outlines your responsibilities and any limitations in the use of the software. All contracts and software are available from the UTCS Information Office, 4 Bancroft Avenue, Room 201. To qualify as a member of the U of T community, you must provide a valid Employee number or Student number.

The table below describes the available site licenses. The Restrictions column specifies who may purchase the license. If the restriction is Research, the payment must come from research money. The Diskettes column describes how you actually receive the software. Large packages, like SAS and SPSS, require that you borrow the diskettes, install the software, and return the diskettes. Smaller packages, consisting of up to five diskettes, require you to bring your own diskettes.

For more detailed information about these site licenses, telephone the UTCS Information Office at 978-4990.

Site Licenses at UTCS

Product Name	***Chaos in the Classroom I: Maps and Bifurcations***	***IMSL***
System	PC;	UNIX Class IVB machines; FORTRAN Subroutines
Restrictions	Faculty, Staff, Graduate Students	U of T-owned machines
Cost	$12	IMSL (MATH, STAT, SFUN): $565; Exponent Graphics: $285; C BASE Library: $265; Interactive Document Facility: $87; Environmental Installation & Assurance Tests: $87; Registration Fee: $588.
License Period	One-time fee	One-time fee
Diskettes/ Distribution	One 5.25" or one 3.5"; bring own	Tape cartridge or network download
Documentation Available at UTCS	Yes	Yes

Product Name	***Novell Netware 3.11***	***IMSL***
System	PC; LAN	UNIX Class IVA machines; FORTRAN Subroutines
Restrictions	University Departments	U of T-owned machines
Cost	Server License: $4690 Upgrade License: $1340 Mac Netware 3.0: $400	IMSL (MATH, STAT, SFUN): $935; Exponent Graphics: $475; C BASE Library: $445; Interactive Document Facility: $140; Environmental Installation & Assurance Tests: $140; Registration Fee: $588.
License Period	One time fee	One-time fee
Diskettes/ Distribution	Deposit $50; borrow and return diskettes	Tape cartridge or network download
Documentation Available at UTCS	Yes	Yes

Site Licenses at UTCS *cont.*

Product Name	***ProComm***	***IMSL***
System	PC; Communications	PC; FORTRAN Subroutines
Restrictions	Faculty, Staff, Graduate Students, Undergraduate	U of T-owned machines
Cost	Free	IMSL (MATH, STAT, SFUN): $195; Registration Fee: $588.
License Period	N/A	One-time fee
Diskettes/ Distribution	Two 5.25"; bring own	Deposit $100; borrow and return diskettes
Documentation Available at UTCS	On disk; part of package	Yes

Product Name	***QuickMail***	***SAS/PC***	***SAS/PC network***
System	Mac; Electronic mail	PC; Statistical analysis	PC; Statistical analysis
Restrictions	Faculty, Staff	Faculty, Staff, Graduate Students, Undergraduate	Faculty, Staff, Graduate Students
Cost	$35 per user Upgrades: $17	BASE/STAT/GRAPH/FSP: $35; IML module: $22; ETS module: $35.	$17 per station
License Period	One-time fee	July 1-June 30	July 1-June 30
Diskettes/ Distribution	One 3.5"; bring own	Deposit per binder (Maximum $350); borrow and return diskettes	Deposit per binder (Maximum $350); borrow and return diskettes
Documentation Available at UTCS	No	Yes	Yes

Product Name	***SAS/UNIX (SUN 3)***	***SAS/UNIX (SUN 4 and HP 8)***	***SPSS/PC***
System	UNIX; Statistical analysis	UNIX; Statistical analysis	PC; Statistical analysis
Restrictions	Faculty, Staff, Graduate Students	Faculty, Staff, Graduate Students	Research
Cost	$198 BASE/STAT/GRAPH; $70 ea. FSP, IML modules	$264 BASE/STAT/GRAPH; $92 ea. FSP, IML modules	$100
License Period	July 1-June 30	July 1-June 30	Nov 1-Oct 31
Diskettes/ Distribution	Tape cartridge	Tape cartridge	Deposit $50; borrow and return diskettes
Documentation Available at UTCS	Yes	Yes	No

Product Name	***SYSTAT***	***WATFOR-77***	***WordPerfect***
System	Mac; Statistical analysis	PC; FORTRAN compiler	PC; Word Processing
Restrictions	Faculty, Staff, Graduate Students	Research	Faculty, Staff
Cost	$58	$35 [$35 WATFOR-87 (math co-processor)]; Add $5 GKS (Graphics Kernal System)	New: $42 Upgrade: $15
License Period	July 1-June 30	July 1-June 30	One time fee
Diskettes/ Distribution	Five 800KB 3.5" diskettes; bring own	Two-three 5.25" diskettes; bring own	Deposit $25; borrow and return diskettes
Documentation Available at UTCS	Yes	Yes	Yes

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